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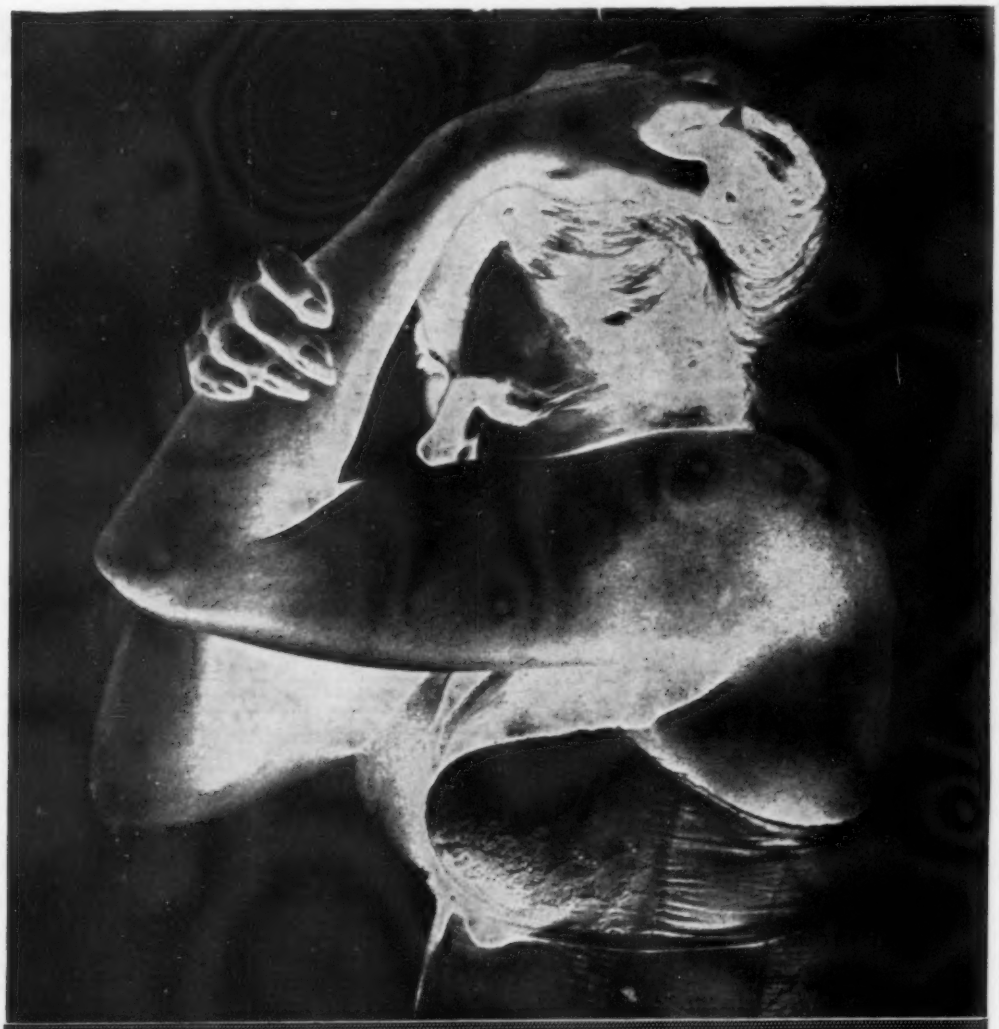

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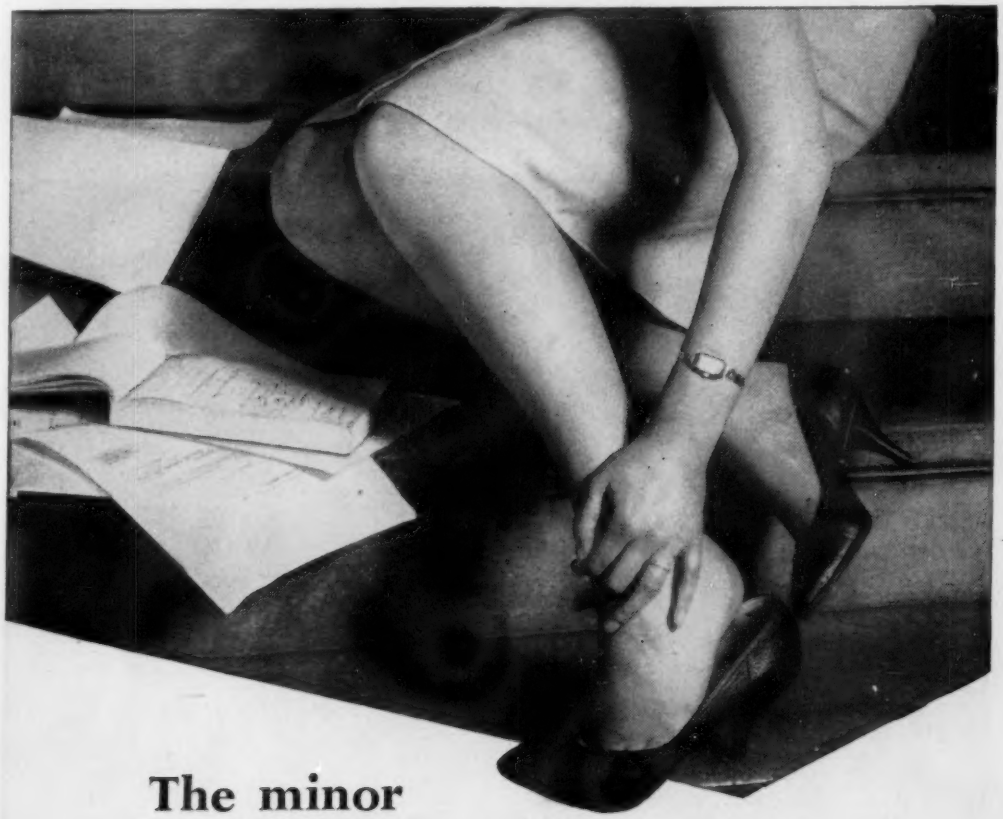


The minor traumatic emergency

Tripping over the mat or falling up a stair often results in strains and sprains which respond satisfactorily to supportive treatment with Elastoplast porous elastic adhesive bandages. All Elastoplast bandages are porous so that while providing firm elastic support with the desired amount of stretch and regain they also permit evaporation of sweat. In order to minimise rucking of bandages and soiling of stockings the adhesive is not spread to the fluffy edges of the bandage. Elastoplast elastic adhesive porous bandages are available in 3-yard lengths and 2″, 2½″, 3″ and 4″ widths. Prescribable on Form E.C.10.

Elastoplast

TRADE MARK

ELASTIC ADHESIVE BANDAGES (Porous) B.P.C.

S&N

SMITH & NEPHEW LIMITED · WELWYN GARDEN CITY · HERTS

"probably safest of all"

—*British Encyclopaedia of Medical Practice*, 6, 407

Cedilanid

BY **SANDOZ**

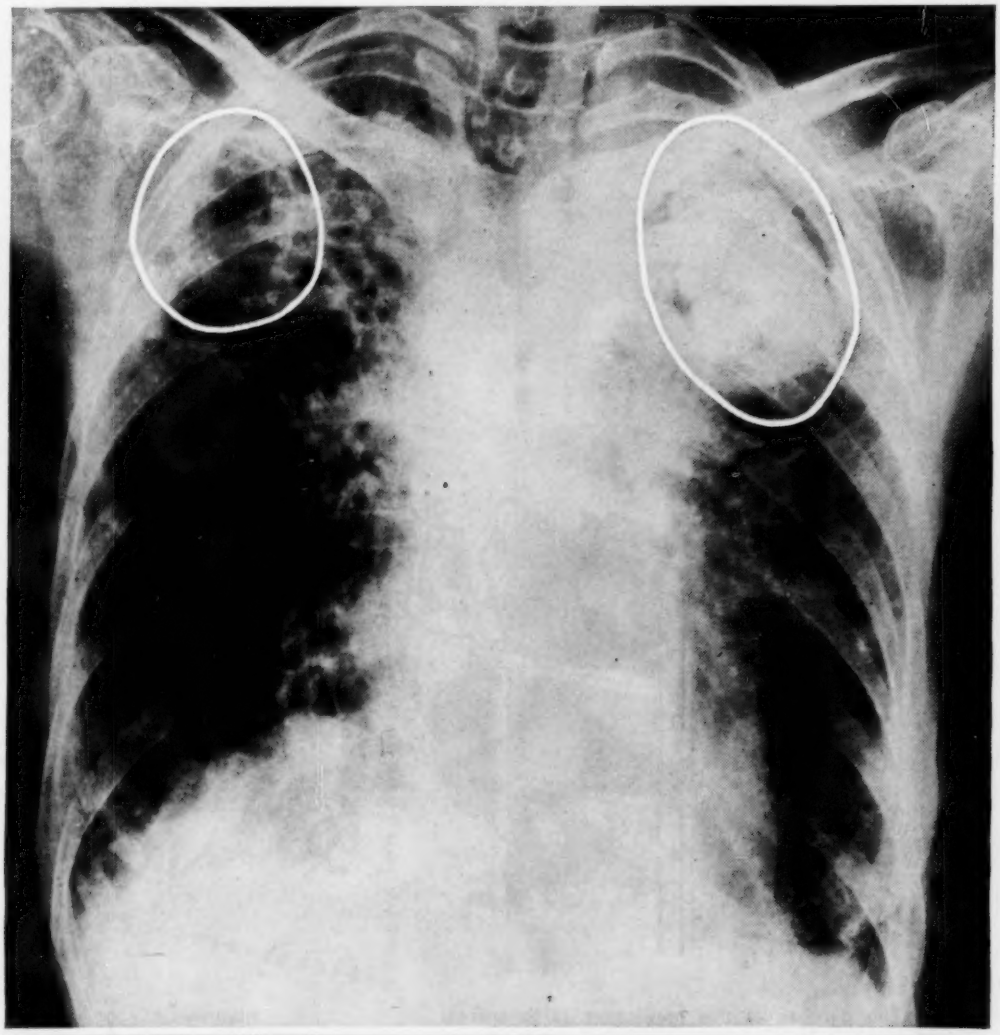
rapid digitalisation

easy maintenance

— and safety above all

TABLETS: 0.25 mg. lanatoside C

AMPOULES: 0.4 mg. desacetyl-lanatoside C in 2 ml.



Long-standing tuberculosis in a woman of 65.
Left: large tuberculous solid area overgrown with Aspergillus.
Right: Large cavity not blocked.

THERAPAS. The original Calcium B-P.A.S.—now widely used as a preferable alternative to P.A.S. Minimises gastro-intestinal upset; virtually tasteless.

Whenever Calcium B-P.A.S. is indicated specify

THERAPAS

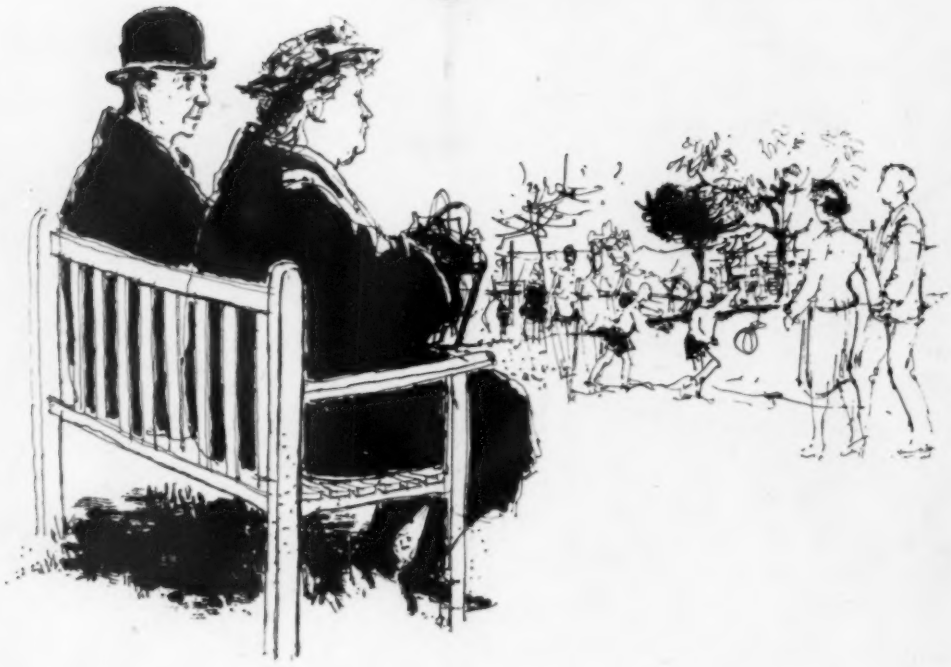
A PRODUCT OF

Smith & Nephew *Pharmaceuticals* Limited

SPECIALISTS IN TUBERCULOSTATIC DRUGS

A new adjunct to geriatric care

'JUVEL'



The purpose of this preparation is to present in convenient and acceptable form a product containing the vitamins most needed for persons beginning to experience symptoms or disabilities from the ageing process.

The formula of 'Juvel' has been designed in consideration of the known defects in the diets of many older patients. The vitamins chosen and the quantities given are related to needs as determined by dietary surveys and the known incidence of disease.

FORMULA

The Daily dose of 1 tablet contains:-

Vitamin A	5,000 i.u.
Vitamin D	500 i.u.
Vitamin B_1	2.5 mg.
Riboflavine	2.5 mg.
Vitamin B_6	2.5 mg.
Nicotinamide	50 mg.
d-a-tocopherol acetate (Vitamin E)	10 mg.
Vitamin C	50 mg.

In Packs of 100 and 500 tablets

Further particulars on this new product from (DEPT. B4).

Σ VITAMINS LIMITED UPPER MALL, LONDON, W.6.

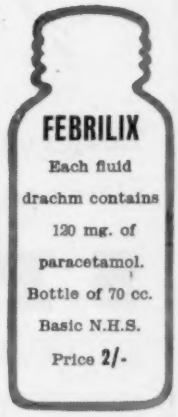
the new *liquid* analgesic and antipyretic

Febrilix

for children

Febrilix (paracetamol elixir) is a new liquid analgesic and antipyretic preparation for children. Being in liquid form it overcomes the disadvantages associated with the administration of tablets to children. It offers the following advantages.

- *well tolerated, safe and effective*
- *palatable liquid readily administered to children of all ages*
- *does not cause gastric irritation*
- *offers flexibility of dosage*



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BOOTS PURE DRUG COMPANY LIMITED · NOTTINGHAM · ENGLAND

Keep your elderly patient alert and active with

SPARINE *trade mark*

the specific anti-agitant, analgesic potentiator and anti-emetic

PACKS: Tablets of 25, 50 and 100 mg. promazine hydrochloride. Bottles of 50 and 250. Solution for injection (100 mg. per 2 ml. ampoule). Boxes of 10.

Write for detailed literature

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Nidoxital

TRADE MARK

anti-nausea capsules

make more mornings
"good mornings"
for patients with
nausea and vomiting of pregnancy

Each capsule contains:

Pyridoxine Hydrochloride	50 mgm.
Nicotinamide B.P.	25 mgm.
Benzocaine B.P.	100 mgm.
Pentobarbital Sodium B.P.	15 mgm.

Ortho

Ortho Pharmaceutical Limited
High Wycombe · England

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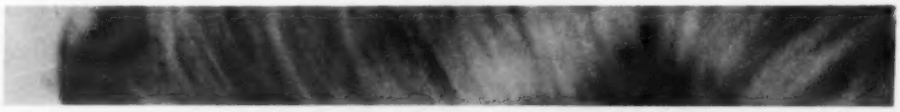


for instant relief and rapid control of sore throats

palatable

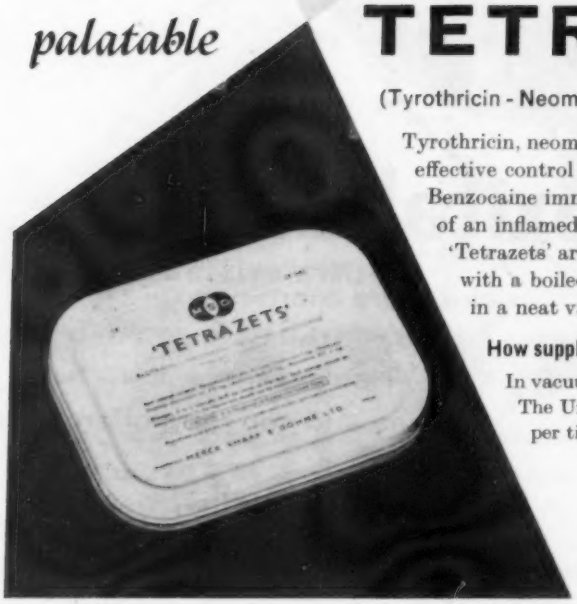
TETRAZETS

REGD.

(Tyrothricin - Neomycin - Bacitracin - Benzocaine)

Tyrothricin, neomycin and bacitracin assure effective control of common throat infections. Benzocaine immediately relieves the soreness of an inflamed pharynx.

'Tetrazets' are pleasantly flavoured lozenges with a boiled sweet base and are packed in a neat vacuum tin.



How supplied:

In vacuum tins of 12 lozenges.
The United Kingdom N.H.S. basic cost per tin of 12 lozenges is 4/4d.

MSD

Made in England by

MERCK SHARP & DOHME LIMITED
HODDESDON, HERTS

RASTINON

THE ORAL TREATMENT OF DIABETES

An advance in the therapy of diabetes

Rastinon tablets, developed by Farbwerke Hoechst AG., of Frankfurt/M., under the research No. D860, have now an established place in the therapy of diabetes mellitus. The large volume of clinical work and the number of papers published, reflect the world-wide interest in Rastinon. This work clearly shows that for the suitable patient Rastinon tablets provide a form of therapy which is

Simple, safe, effective and economical

Rastinon is not a "sulphonamide drug," has no anti-bacterial action and does not produce crystalluria. No cases of dyshaemopoiesis or other serious side-effects have been reported among the many thousands of patients satisfactorily controlled for more than two years.

The suitability of a patient for treatment with Rastinon tablets is readily assessed in the diabetic clinic and once stabilised no difficulties have been experienced in controlling the patient. An acute intercurrent infection may necessitate a temporary return to insulin therapy.

DOSAGE

Once stabilised, from one to three tablets a day are normally all that is required to replace the insulin with its concomitant syringe, needles, swabs, and often nursing assistance as well. During the period of stabilisation it has been found that generally from four to eight tablets on the first day, three to six on the second and three to five on the third are sufficient.

The daily amount should be divided into two or three doses and taken during or after meals with a little fluid. Higher doses are not usually more effective and are not recommended as they may occasionally cause hypoglycaemic reactions. The normal regime of urine examination and dietary control remains necessary.

To lessen the possibility of the patient taking a tablet other than Rastinon in error, each tablet is engraved with the name Rastinon and the trade mark of the originators.

PACKS

Bottles of 100 and 500 tablets—each tablet contains 0.5 G. N-Butyl-N'-toluene-p-sulphonylurea (tolbutamide). The basic cost to the N.H.S. of a week's treatment is on average between 3/6d. and 5/3d.

REFERENCES

Die Naturwissenschaften, 1956, **43**, 93
Metabolism, November, 1956 (entire issue)
Lancet, 1957, **1**, 753
Brit. Med. J., 1957, **2**, 323, 325, 327, 343, 351
Dtsch. med. Wschr., 1957, **82**, 1513-1592 (entire issue)
Brit. Med. J., 1957, **2**, 1345
J. of Endocrinology, 1957, **15**, 45
Brit. Med. J., 1958, **1**, 220
Lancet, 1958, **1**, 278

Further information on request.

Rastinon tablets are made in England and are obtainable exclusively from:

HORLICKS LIMITED, SLOUGH, BUCKS.

Sole distributors in the United Kingdom for

HOECHST PHARMACEUTICALS LIMITED, SLOUGH

First choice

in all common infections of the mouth and throat

Strepsils
ANTISEPTIC LOZENGES

containing Dybenal, the powerful new antiseptic developed in the research laboratories of Boots Pure Drug Company Limited.

* VERY WIDE RANGE OF ACTIVITY
* RAPID BACTERICIDAL ACTION
* PROLONGED EFFECT
* SOOTHING
* NON-TOXIC
* NON-SENSITISING
* ECONOMICAL

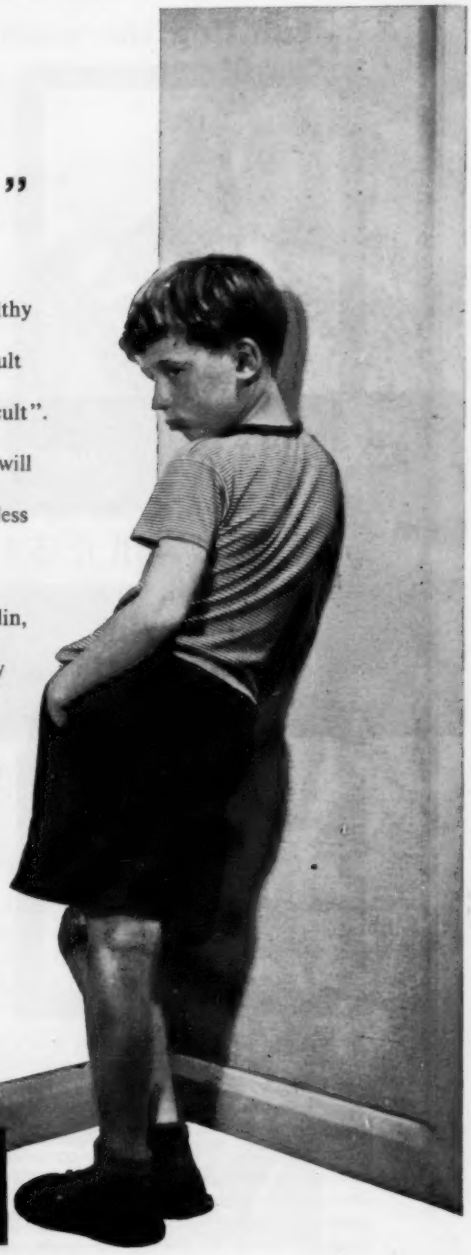
Basic N.H.S. Price 1/9½ for 24 lozenges

Literature and further information gladly sent on request

BOOTS PURE DRUG COMPANY LIMITED • NOTTINGHAM • ENGLAND

Boots

"He's such a problem, Doctor . . . . !"



In every other respect a normal healthy child, he has never been dry at night, with the result that he has acquired undeservedly the label "difficult". As he grows older his shame and embarrassment will become more acute as those around him become less tolerant of his disability.

In his case, as in the case of many others, Di-sipidin, by controlling enuresis symptomatically on strictly physiological lines, offers a real prospect of an early return to normal function with a consequent restoration of confidence and self-respect.

References: BMJ (1954)11, 1433; BMJ (1954)1 1038; BMJ (1955)1 1194; LANCET (1955)i 1228; LANCET (1956)ii 1334

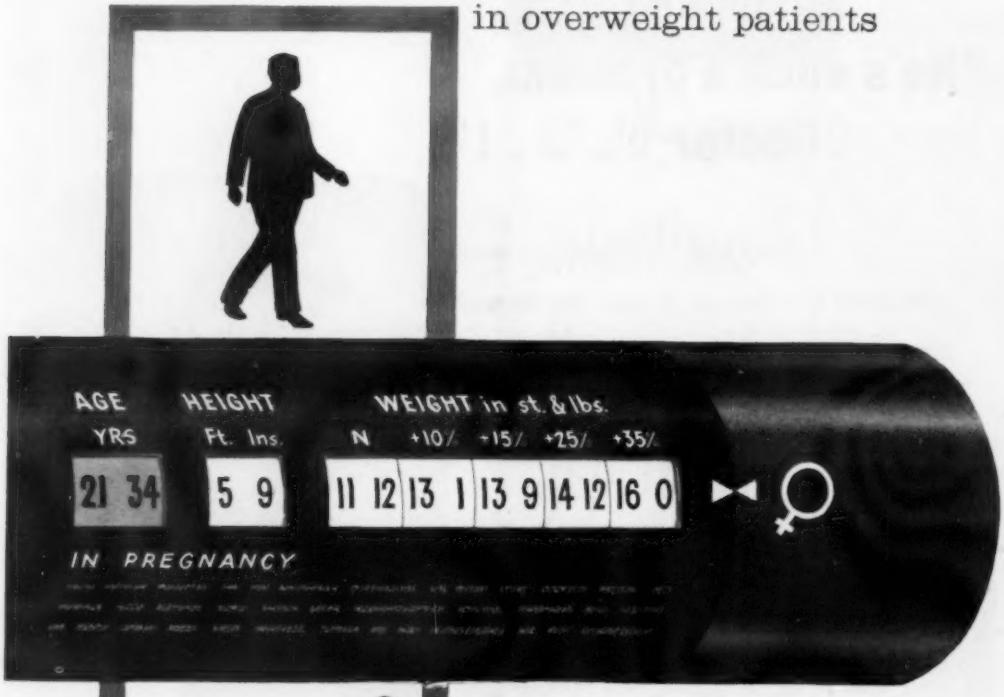
DI-SIPIDIN

INSUFFLATIONS

Packings: Capsules: 25, 100, 500
Outfit: Di-sipidin Insufflator and 25 capsules.

PAINES & BYRNE LTD., PABYRN LABORATORIES, GREENFORD, MIDDX.

calculating the mathematics of mortality in overweight patients



†The Preludin Percentage Overweight Calculator is a device that enables the practitioner to read at a glance the percentage of excess weight carried by any patient—male or female. It is available on request to members of the medical profession with the compliments of Pfizer Limited on behalf of C. H. Boehringer Sohn.

When this Calculator† indicates that a patient has passed the danger-degree of 15% overweight he should—in his own interests—be acquainted with the risk he is running. *For instance, an 11¼ stone man of 35 whose constitutional weight should be 10 stone can suffer a loss of life-expectancy amounting to between 6 and 7 years.*[1]

Preludin is the treatment of choice for cases of this kind. It corrects the chief cause of excessive weight—over-eating—by restoring the balance between food-intake and energy-output.

Preludin acts directly on the appetite-satiety centre in the hypothalamus and, by producing early satiety without suppressing the appetite, effectively curbs excessive food-intake *at the source*. It creates no undesirable side-effects, and represents a particularly safe and rational approach to the problem and dangers of excessive weight.

[1] *Based on Price's Textbook of the Practice of Medicine, ninth edition, page 449.*

PRELUDIN *

Brand of 2-phenyl-3-methyl-tetrahydro-1, 4-oxazine-hydrochloride

Manufactured and distributed in the U.K. by Pfizer Ltd., Folkestone, Kent, for
C. H. Boehringer Sohn, Ingelheim am Rhein,
Registered Proprietors of the Trade Mark. *Regd. Trade Mark

409300

New manufacturing technique brings significant increase in initial acid adsorption*

INTRODUCING DROXALIN GEL

Rapid adsorption of gastric hydrochloric acid is accepted as the most effective method of obtaining relief in peptic ulcer pain.

* In two minutes a single teaspoonful (3.5 mls.) of DROXALIN GEL will neutralise 50 mls. of N/10 HCl. This is *several times* the speed of acid adsorbents prepared by usual methods.

Using the well established Droxalin formulation a new and exclusive manufacturing technique has produced in DROXALIN GEL an antacid possessing this significant increase in initial acid adsorption. The advantages of quicker acting DROXALIN GEL in peptic ulcer therapy and hyperacidity will be readily recognised. The palatability of Droxalin Tablets is achieved.

DROXALIN *Gel*

ACID ADSORBENT

Droxalin palatability in liquid form

ACTIVE INGREDIENTS	DOSAGE	PACKS AND PRICE
Each teaspoonful (3.5 mls.) contains 60 grains Aluminium Hydroxide Gel B.P. (equivalent to 5 grains Dried Aluminium Hydroxide Gel B.P.) and 5 grains Magnesium Trisilicate B.P.	One or two teaspoonfuls one half-hour after meals. Repeat as necessary.	DROXALIN GEL is available in 8 oz. and 80 oz. bottles. Prescribable on E.C.10. Basic N.H.S. cost. 1/10d per 6oz. bottle.

CLINICAL TRIAL SAMPLES ON REQUEST TO :— SCOTT & TURNER LTD. NEWCASTLE UPON TYNE

AVOID
salicylate anæmia*

with **Antidol** REGD

An entirely **NEW** analgesic

Salicylamide-(2-ethoxyethyl)-ether

combined with Phenacetin and Caffeine

Antidol REGD

contains no aspirin and avoids the hazard of gastro-intestinal bleeding associated with the administration of all forms of aspirin

The results of an investigation carried out at a London Teaching Hospital concluded:

'94.3% of the patients taking **Antidol** obtained relief of pain as against only 81.4% in the case of Calcium Aspirin. It would seem that **Antidol** is a more reliable analgesic than Calcium Aspirin'

Indications All forms of rheumatism, arthritis, fibrositis, dysmenorrhœa, headaches of non-organic origin, dental pain etc. Its powerful antipyretic properties make **Antidol** a valuable preparation for the common cold.

Packings Packs of 20, 100 and 500 tablets of 0.5g in foil wrapping

Basic N H S cost of 20 Antidol tablets is less than 1/9

Samples and literature on request

LEWIS LABORATORIES LTD · LEEDS 9

*Lancet Nov. 1st, 1958 p. 925

the all-purpose diuretic

DIAMOX*

ACETAZOLAMIDE

*REGD. TRADEMARK

proven by 6 years' clinical use

Its ever-widening applications include cardiac oedema, epilepsy, acute glaucoma, premenstrual tension, toxaemias and oedema of pregnancy.

TABLETS: *Diamox Acetazolamide Tablets of 250 mg. (engraved) Bottles of 25, 100 and 1,000*

PARENTERAL: *Diamox Acetazolamide Sodium Parenteral 500 mg. Vials of 500 mg.*

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LEDERLE LABORATORIES DIVISION

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Cyanamid OF GREAT BRITAIN LTD., London, W.C.2

has been achieved with—

THE IONEXTEN† ORAL DEPOT RANGE

asmapax* (bonded ephedrine)

barbidex* (bonded dexamphetamine plus phenobarbitone)

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spastipax* (bonded belladonna alkaloids bonded amylobarbitone)

giving 12 hours sustained action from a single dose.

Basic N.H.S. cost for 30 tablets: asmapax 5/-, barbidex 3/10, dexten 2/6, spastipax 5/-

CLINICAL PRODUCTS LTD • RICHMOND • SURREY

first in the field of oral depot therapy CPL

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BRAND OF NORETHYNODREL AND ETHYNYLOESTRADIOL 3-METHYL ETHER

For the specific control of menstrual irregularities

ENAVID, containing the new Searle steroid norethynodrel, permits *specific* and usually complete *control* of the menstrual cycle on *oral* administration and thus provides effective therapy for most menstrual irregularities.

ENAVID has strong progestational and a lesser oestrogenic activity on the endometrium, which stimulates its development to a secretory phase. It also inhibits the secretion of gonadotropins by the anterior pituitary gland.

ENAVID is therefore recommended for:

- **AMENORRHOEA** (Primary and Secondary)
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- **DYSMENORRHOEA**
- **PREMENSTRUAL TENSION** and the
- **"INADEQUATE LUTEAL PHASE"**

ENAVID is supplied as 10 mg. tablets in bottles of 20 and 50 tablets.

Detailed literature is available on request.

* *Trade Mark.*

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EN : P117

GRAND MAL EPILEPSY

"... a state produced by intense, spontaneous neuronal activity which has a tendency to spread throughout the grey matter of the brain with unbridled augmentation ... like a prairie fire"

W. Penfield.

EPANUTIN* (phenytoin sodium) offers four epileptics out of five the opportunity of leading normal lives. The control of seizures by this powerful anticonvulsant is achieved with negligible hypnotic effects, and is frequently accompanied by improved psychological outlook and mental alertness. Some cases of *grand mal* respond better to a combination of Epanutin and Phenobarbitone than to either of these drugs given separately.

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EPANUTIN

anticonvulsant with minimal hypnotic action

Epanutin Capsules (1½ grs. and ½ gr.) bottles of 100 and tins of 1,000.

**Epanutin and Phenobarbitone Capsules. Each capsule contains 1½ grs. Epanutin and ½ gr. Phenobarbitone. Bottles of 100 and tins of 1,000.*

Epanutin Suspension. Each 4 ml. (one teaspoonful) contains 100mg. (1½ grs.) of diphenylhydantoin. Bottles of 4, 16, and 80 fl.ozs.

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PARKE, DAVIS & COMPANY, LTD. *(Inc. U.S.A.)* HOUNSLOW, MIDDX. Tel: Hounslow 2361

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"Here's a health unto His Allergy!"

Sandosten Effervescent Tablets

BY **SANDOZ**

25 mg. thenalidine tartrate
0.579 g. calcium lactate
0.794 g. calcium gluconate

anti-allergic, anti-pruritic

The effervescent anti-allergic drink

Samples upon request

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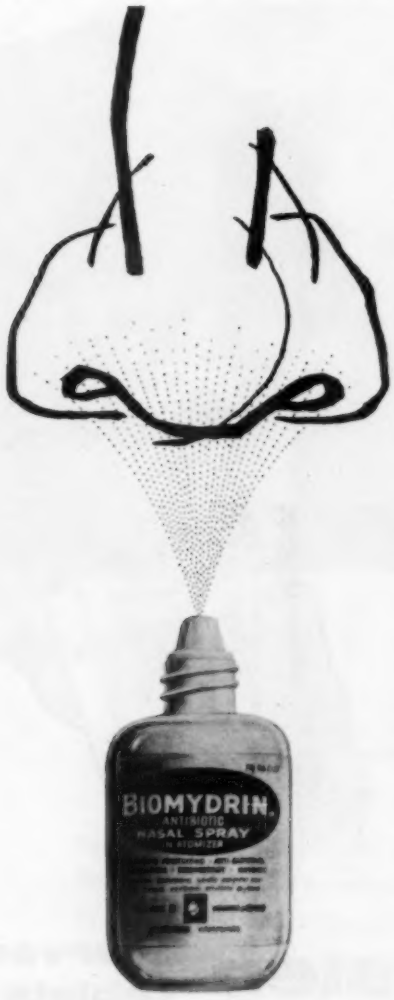

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Biomydrin lets the air come through

Biomydrin
the complete nasal spr

WILLIAM R. WARNER & CO. LTD., EASTLEIGH, HAMPSHIRE.

WARNER

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Biomydrin

TRADE MARK

he first **complete** nasal spray
nore than just a decongestant

ENETRATION

Biomydrin contains thonzonium bromide, a new mucolytic agent which disperses the mucus barrier, thus ensuring that all the therapeutic agents reach the affected areas. In addition, thonzonium bromide is a surface tension depressant and therefore promotes the spread of the solution.

NTI-ALLERGIC ACTION

The Biomydrin formula includes the antihistamine, thonzylamine hydrochloride, and is accordingly effective in allergic conditions.

NTIBACTERIAL ACTION

Biomydrin contains two antibiotics—neomycin and gramicidin. These, together with the potent bactericidal action of thonzonium bromide, provide effective control against a wide range of pathogens. With Biomydrin, decongestion is promoted and sustained, resulting in rapid control of symptoms. There is no central stimulation.

Biomydrin is presented in a self-sterilizing, plastic spray container convenient for the pocket, containing one half fluid ounce.

Biomydrin Nasal Spray is available on prescription only; it cannot be bought by the public for self-medication.

FORMULA: *Neomycin Sulphate* 0.1%. *Gramicidin* 0.005%. *Thonzylamine Hydrochloride* 1.0%. *Phenylephrine Hydrochloride* 0.25%. *Thonzonium Bromide* 0.05%. *(N-(2-pyrimidyl)-N-(p-methoxy-benzyl)-N', N'-dimethyl-N'-cetyl-N'-bromoethylene diamine.) Preserved with thiomersal* 0.002%.

THE BASIC N.H.S. COST OF BIOMYDRIN IS 3/6½d. EACH IN THE U.K.

BIO 397

Ledercort*

TRIAMCINOLONE (9 ALPHA-FLUORO-16 ALPHA-HYDROXYPREDNISOLONE)

A CLEAR-CUT ADVANCE IN CORTICOSTEROID THERAPY

The properties of LEDERCORT Triamcinolone not only distinguish it as a new, superior corticosteroid of great promise; they confirm that a definite advance has been made in reducing the side-reactions hitherto encountered with corticosteroid therapy. LEDERCORT does more than offer equivalent anti-inflammatory and anti-allergic benefits; it does so in a dosage that averages 1/3 less than either prednisone or prednisolone—a factor which underlines the high potency of this new steroid. LEDERCORT secures the utmost effectiveness of corticosteroid therapy with a lower incidence of such side-effects as peptic ulcer, osteoporosis, epigastric distress, diabetic state and cushinoid 'obesity'. LEDERCORT, moreover, causes no oedema, no hypertension, no weight gain and no potassium depletion.

*REGD. TRADEMARK

LEDERCORT means economical and uncomplicated long-term therapy

Oral tablets of 4 mg., scored for easy division.
Bottles of 30, 100, and 500.

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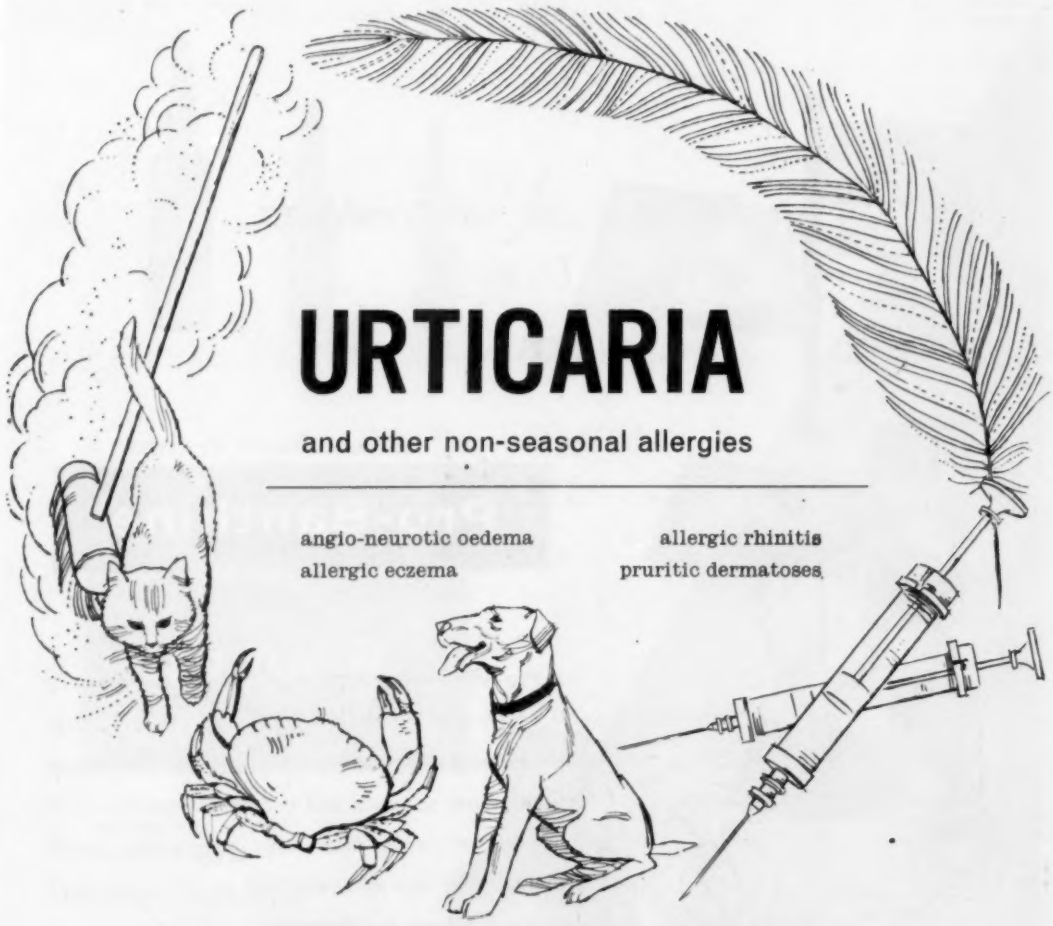
Cyanamid OF GREAT BRITAIN LTD., London, W.C.2



URTICARIA

and other non-seasonal allergies

angio-neurotic oedema
allergic eczema
allergic rhinitis
pruritic dermatoses

PIRITON

- gives prompt and sustained symptomatic relief
- effective in a dosage the fraction of most other antihistamines
- rapidly controls pruritus in allergic dermatoses
- notably free from side-effects
- can be given with safety to children
- available in a complete range of dosage forms

For initial, supplementary or routine therapy

PIRITON TABLETS
Each tablet contains 4 mg. Piriton (chlorpheniramine) maleate.
Bottles of 25 and 500 tablets.

For sustained relief

PIRITON DUOLETS
Each Duolet contains 8 mg. Piriton (chlorpheniramine) maleate; 4 mg. in the outer shell for immediate action and 4 mg. in the specially-coated inner-core, for delayed action.
Bottles of 25 and 250 Duolets.

For emergencies

PIRITON INJECTION
Contains 10 mg. Piriton (chlorpheniramine) maleate in 1 c.c.
Boxes of 5 and 100 ampoules of 1 c.c.

STANDARD REFERENCE CARD ON APPLICATION

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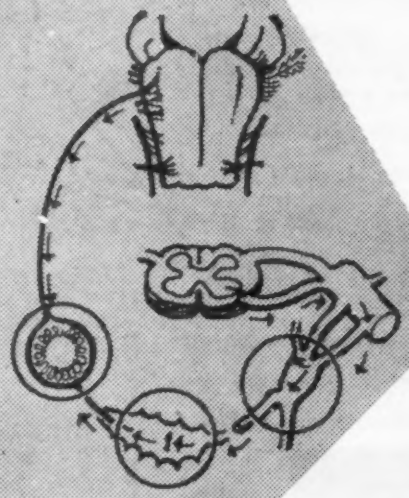
Effective and safe treatment of Peptic Ulcer



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BRAND OF PROPANTHELINE BROMIDE

Pro-Banthine is the standard anticholinergic drug which in properly adjusted dosage, effectively suppresses gastric hypermotility, reduces the volume of gastric secretion and encourages healing of all types of peptic ulcer. By suppressing gastric motility a test dose will help to provide a clear X-ray picture for diagnosis.

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Both PRO-BANTHINE (15 mg.) and PRO-BANTHINE with Phenobarbitone (15 mg. of each) are available in sugar-coated tablets in bottles of 40, 100 and 1,000 tablets.

PARENTERALLY
1 c.c. vials containing 30 mg. of PRO-BANTHINE as a dry, sterile powder for preparation of intramuscular or intravenous injections, are available in boxes of 6 and 25 vials.

SEARLE

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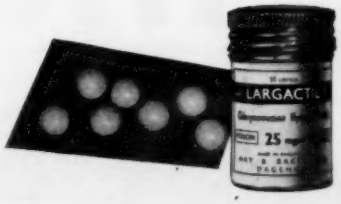
A variety of presentations to meet a wide range of indications



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CHLORPROMAZINE HYDROCHLORIDE

has important established uses in

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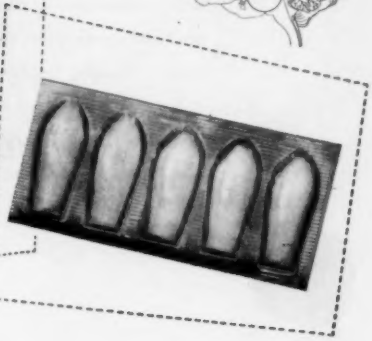

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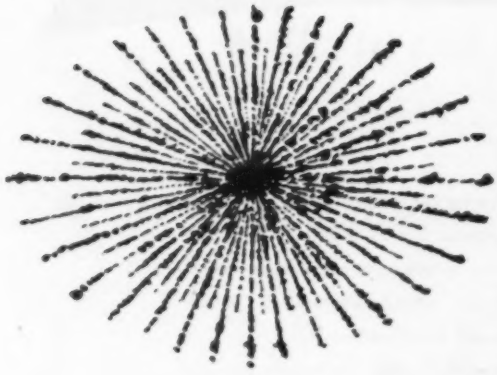

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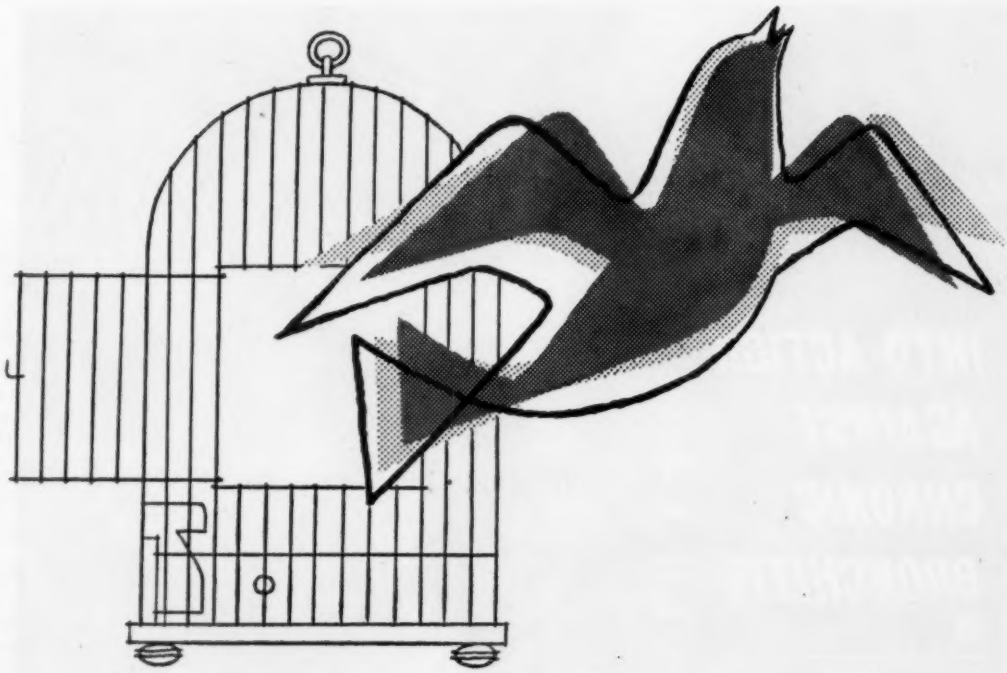

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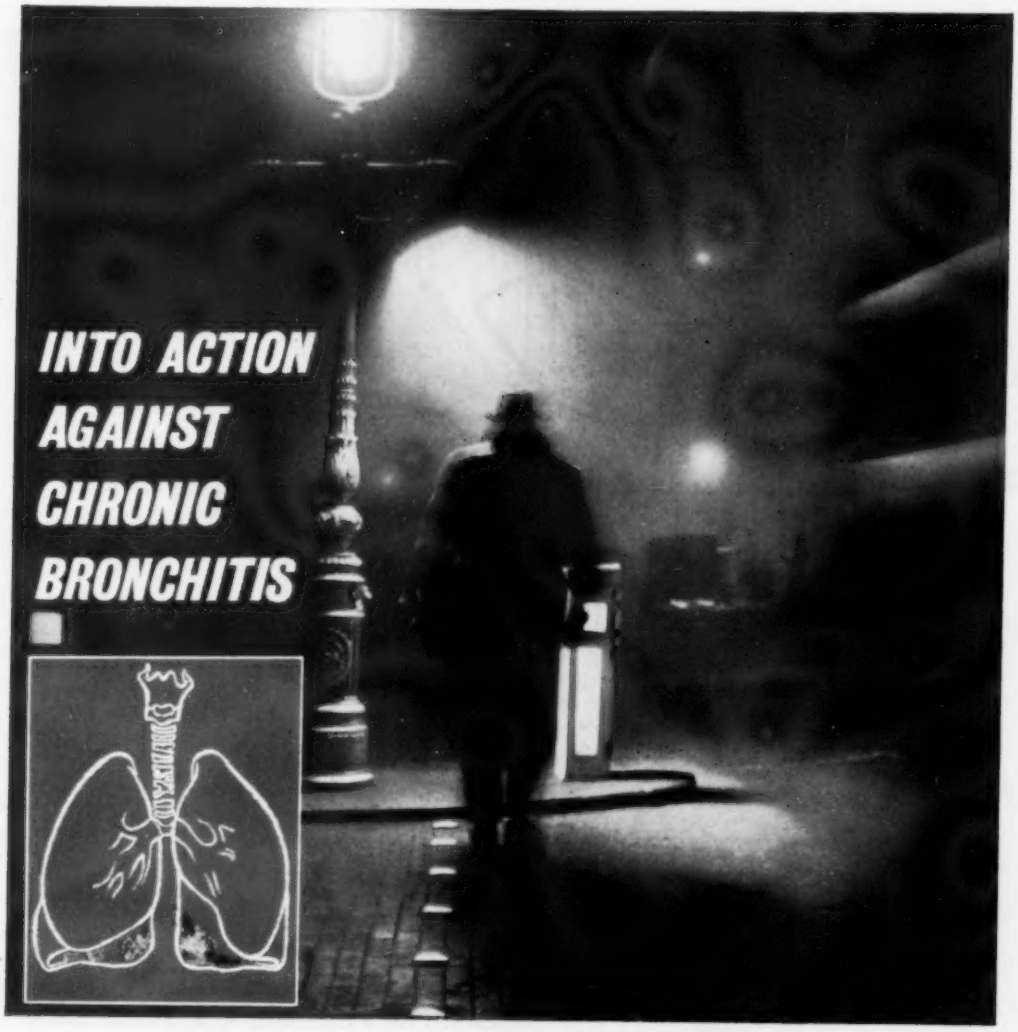

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NEUROLOGICAL SYNDROMES ASSOCIATED WITH CARCINOMA *

THE CARCINOMATOUS NEUROMYOPATHIES

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FOR many years it has been known that in patients suffering from carcinoma the nervous system may become disordered independently of the presence of metastases.

Oppenheim (1888) suggested that this was the result of a toxic process, a view supported by Nonne (1900) and Siefert (1902). Hassin (1919) thought that Oppenheim's observations were due to microscopic metastases, but Hassin and Singer (1922), studying metastatic carcinoma of the brain, reached the conclusion that, in addition to infiltration and metastases, " cerebral carcinoma also damages the brain tissue by chemical or toxic action. This is evidenced by diffuse encephalitis ". Harris (1926) alludes to polyneuritis associated with carcinoma, and Wexburg (1935) gives reference to it. Merritt and Fremont-Smith (1937) state that the cerebrospinal fluid in such cases is usually normal. Kinnier Wilson (1940) also refers to it.

Modern knowledge of these nervous complications of carcinoma, however, begins in 1948 when Denny-Brown (1948) reported two cases of sensory neuropathy due to posterior-root-ganglion degeneration in patients with carcinoma of the lung. Leigh and Meyer (1949) noted selective degeneration of the granular layer of the cerebellum in eight cases of visceral carcinoma. Lennox and Prichard (1950) drew attention to the significant frequency with which peripheral neuropathy accompanies lung carcinoma, while Brain et al. (1951) reported the association of spinocerebellar degeneration with carcinoma of the lung and ovary. More recently Henson (1953), Henson et al. (1954), and Heathfield and Williams (1954) have made further contributions.

During the past few years we have continued to see a considerable number of patients exhibiting various neurological disorders in association with carcinoma, and in the absence of relevant secondary deposits. Our joint experience now totals forty-two cases; twenty of these have been reported previously, one by Brain et al. (1951) and nineteen by Henson et al. (1954); the remaining twenty-two patients have been encountered in the past 4 years. In all these patients there was histological proof of the diagnosis of carcinoma, whilst twenty-two post-mortem examinations have ensured that the syndromes described here have not been due to secondary deposits. We think the time is appropriate to publish this short review of our findings.

Classification

In carcinomatous neuropathy the nervous system may be affected at many levels in the same patient, and muscles may also be involved: precise classification is therefore difficult. We have recently been using the term carcinomatous neuromyopathy to describe the whole group. The sensory neuropathies (with posterior-root-ganglion degeneration) and the cortical cerebellar degenerations (with widespread loss of Purkinje cells) constitute, in our experience, the purer forms. Clinically, patients with the proximal muscular syndrome commonly exhibit an exclusively motor disorder, often of remittent type, but here the basic pathological lesion responsible for the muscular atrophy remains obscure. We would classify our patients broadly as follows:

Cortical cerebellar degeneration	8
Mixed forms	7
Sensory neuropathy	5
Peripheral neuropathy (sensorimotor)	5
Neuromuscular disorders	17
Total	42

Sites of Underlying Carcinomas

The sites of the carcinoma were:

Lung (males 23, females 9)	32
Ovary	4
Prostate	2
Rectum (males)	2
Breast	2
Uncertain (secondary glands in neck. Male ? primary in lung)	1
Total	43

(One patient had two cancers.)

In particular we have no examples of the association of carcinomatous neuromyopathy with carcinoma of the uterus or œsophagus.

Relation Between Neurological Syndromes and Associated Carcinoma

Though in some patients the unrelieved progression of untreatable cancer has obscured or arbitrarily terminated the course of the neurological disorder, we have had ample opportunity to study the natural history of the various types. As we have remarked elsewhere (Henson et al. 1954), there is no constant relation between the course of the neurological disorder and that of the carcinoma. Although the neuromyopathy may develop pari passu with the tumour, neurological symptoms may antedate the clinical manifestations or diagnosis of the growth by periods of at least 3 years. Exceptionally the neuromyopathy may arise after the successful removal of the cancer. This happened in two of our patients, one of whom has an 8-year survival after surgical removal of a carcinoma of the lung. Patients with neuromuscular disorders or mixed forms of peripheral neuropathy have shown striking remissions, and even recovery from their neurological symptoms, at times when they have been seriously ill and near death from the effects of the growth. Again, there is no relation between the size of the cancer and the severity of the neuropathy: for example, we have seen severe neuromyopathy in patients with a small carcinoma, only detected postmortem. Occasionally the neurological picture develops in the terminal stages of the carcinoma. Surgical removal of the cancer generally has no effect on the course of the neurological syndrome, but we have seen one case in which improvement in muscular weakness followed excision of carcinoma of the lung. As this symptom is liable to remit spontaneously, we would regard the amelioration in this patient as fortuitous.

* This paper formed the basis of a communication by one of us (R. B.) to the Fifth International Congress of Internal Medicine at Philadelphia, 1958.

Clinical and Pathological Features

Cortical Cerebellar Degeneration

In our series there are eight cases of cortical cerebellar degeneration. Pathological confirmation of the diagnosis is available in three; the remainder were diagnosed on the clinical picture. The three postmortem examinations revealed a striking loss of Purkinje cells in the cerebellar cortex: in one patient not a single Purkinje cell was found, and there was also some loss of granular cells in the same region. In another patient there was perivascular cuffing in the spinal cord—a subject to which we shall return.

Clinically the picture was one of subacute, or even acute, cerebellar disorder. Vertigo, ataxia, severe cerebellar deficit in the limbs, dysarthria, diplopia, and nystagmus were the characteristic features. Mental changes have been prominent. All but one of our patients were eventually demented, to a greater or lesser degree, but in two the initial psychiatric picture was one of agitation and depression. Extensor plantar responses may be present, and one of our patients had continuous involuntary movements. The disability may be so rapidly progressive that in a matter of a few weeks the patient is unable to walk or stand. On the other hand the full clinical picture may take at least a year to develop. We have seen the complaint become arrested, short of complete disablement, after progressing insidiously for several months; but six of our patients have been helpless or almost so. Remission has not been a feature. The dementia may progress insidiously after the cerebellar affliction has become arrested or complete. In our series this form of carcinomatous neuropathy has been associated with carcinoma of the lung, breast, and ovary.

Mixed Form

There are seven patients in this group, all of whom had symptoms and signs of cerebellar disorder among their many disabilities. The term subacute spinocerebellar degeneration has been applied to this clinicopathological state; but, as Henson et al. (1954) pointed out, the name hardly describes the pathological or clinical picture. In our three patients examined postmortem, the only cerebellar change found was degeneration of the cells of the dentate nucleus coupled with a loss of fibres in the superior cerebellar peduncles. Barraquer-Bordas and Lowenthal (1953) discovered similar changes in their case 2, but here the inferior olives were also involved. The subthalamic nuclei may be selectively and severely affected (Greenfield 1934, Brain et al. 1951, Henson et al. 1954). Apart from these changes there are also found degeneration of the motor cells in the spinal cord and brainstem nuclei, degeneration of the pyramidal tracts and posterior columns in the spinal cord, cellular infiltration of the meninges, and perivascular cuffing of the vessels of the spinal cord and of the medulla below the floor of the fourth ventricle. Pathologically these cases might reasonably be termed encephalomyelitic in view of the inflammatory changes.

The clinical findings in these patients are as varied as the pathological findings would lead us to expect. Cerebellar signs are present in all, though less prominently than in the first group. Muscular wasting and weakness affect the limbs. Bulbar palsy, ptosis, and weakness of external ocular movements also occur. Extensor plantar responses are common, but the tendon reflexes are generally reduced; in one exceptional case there was a striking exaltation of the tendon reflexes. Involuntary movements may be prominent. Pains and dysæsthesiæ in the limbs may be severe; impairment of postural and vibration sense and, less commonly, cutaneous sensory loss of peripheral distribution are found. Again, mental changes may be prominent. The course of the illness may be long, certainly for more than 2 years; indeed one of our patients grew steadily worse over a period of 2 years before serial X-rays revealed the associated lung carcinoma. The symptoms are usually sufficiently disturbing, however, for the patient to consult a doctor within a few weeks of onset. They may arise, as we have already stated, after the patient has come under treatment for the associated carcinoma. There was one complete and lasting remission in this group; in this patient the signs were predominantly those of a peripheral neuropathy, but unquestionable mild cerebellar disorder was present. All the other patients were severely or completely disabled in periods varying from 3 months to 2 years. The underlying cancers were in the lung and breast.

Peripheral Neuropathy

Sensorimotor.—There are five patients in this group. The clinicopathological picture is not remarkable. All the patients suffered motor and sensory symptoms of the usual type. However, in this group also the clinical picture was not a pure one, for dementia and extensor plantar responses were present on occasion. Postmortem examination in two cases shed little light on the problem. Complete remissions occurred in two patients, in one instance 6 months before symptoms directly due to the cancer developed. All these five patients had lung cancers. Victor et al. (1958) have described a sensorimotor polyneuropathy with degeneration of peripheral nerves in patients with myelomatosis.

Sensory.—The pathological picture consists in degeneration and loss of neurones in the posterior root ganglia, with associated degeneration of the peripheral nerves and posterior columns, as described by Denny-Brown (1948). We have five examples with four postmortem examinations. In one of these cases microscopy revealed an intense lymphocytic infiltration of the posterior root ganglia and gross perivascular cuffing in the medulla in the floor of the fourth ventricle; otherwise the changes were as described by Denny-Brown. Examination of muscles has shown non-specific changes. Clinically the picture, at least in the earlier stages, is one of a pure sensory neuropathy without motor weakness. Pains and dysæsthesiæ in the extremities may be severe and persistent, with gradual development of total sensory loss in the limbs and consequent ataxia. The face and trunk may be included. Virtually complete deafferentation may ensue, and all but one of our patients were completely disabled by sensory ataxia. Naturally, the tendon reflexes are lost. Associated symptoms included gross hysteria in two patients, dementia in one, and extensor plantar responses in another. The course varied from 2 months to more than a year. No remission occurred, but we noted arrest in one patient. Muscular wasting and weakness follows in time, but we would attribute this to disuse, consequent on ataxia, decubitus, and cachexia, rather than to any more specific neuromuscular disorder.

All our patients had lung cancer. Bosanquet and Henson (1957) have described a similar clinicopathological condition in a patient with diabetes mellitus.

Motor.—It will be obvious that some of our patients in the mixed group had a motor neuropathy inasmuch as their muscular weakness was due to loss of anterior horn cells.

Neuromuscular Disorders

Generalised muscle atrophy with some degree of enfeeblement is a common manifestation of advancing carcinoma: the precise mechanism of this form of myopathy is not understood, but presumably nutritional, biochemical, and toxic factors may play their parts. Secondary deposits may lead to neural atrophy by compression or invasion of nerve-roots, nerves, or rarely of the spinal cord itself. The muscular weakness and wasting associated with disuse and decubitus have been mentioned previously.

When all these factors have been excluded there remain twenty-seven patients with neuromuscular disorders. Five of these fall into the mixed or encephalomyelitic group, and the explanation here appears to be a loss of motor cells in the brainstem and cord, as already described; this was proved at necropsy in two cases, while in a third the site of the lesions was not established. In five more the motor disorder arose in a clinical setting of peripheral neuropathy, and, though the causal lesions were not discovered, there seems no reason to doubt that the muscular atrophy was of neural origin.

If we exclude two patients in whom serious muscular weakness, though certainly present in a mild degree previously, developed after surgical procedures carried out under anæsthesia with muscle relaxants (Croft 1958), fifteen patients remain. One of these had a remittent form of peripheral muscle weakness with very slight sensory symptoms, and postmortem examination revealed some evidence of a motor neuropathy in the form of loss of anterior horn cells with associated degeneration in the anterior spinal roots. The remaining fourteen patients have presented with the proximal muscular syndrome—i.e., weakness affecting limb girdles and trunk. One of these had dermatomyositis, as evidence by rashes and by characteristic changes at necropsy. In the remainder the onset of symptoms was usually subacute, with a history of a few weeks or months. Diplopia, ptosis, and bulbar paresis have sometimes been present. Fasciculation was not seen, but myasthenia has been an occasional feature, some patients responding to the administration of neostigmine. The carcinomas were mainly bronchial, but there were examples of rectal and prostatic growths. This syndrome showed a marked tendency towards spontaneous remission. The distribution of the weakness resembled that encountered in most diseases of muscle, and the clinical resemblance to thyrotoxic myopathy, myasthenia gravis, and dermatomyositis or polymyositis may be close. Nevertheless there was clinical evidence of nervous lesions in some cases—for example, depression of tendon reflexes beyond the field of weakness, dysæsthesiæ, muscular tenderness, transient extensor plantar responses, and even dementia. Patients with such evidence of neural lesions occasionally had myasthenic weakness responsive to neostigmine.

Eight patients had no clinical evidence of neural lesions at any time during the course of their illnesses, using the most stringent criteria. These form the group which we have previously labelled carcinomatous myopathy; none have had skin lesions. Postmortem examinations in seven cases (including three cases of carcinomatous myopathy), and muscle biopsy in four, have yielded no clues as to the site of the lesion responsible for the muscular wasting. In particular, examination of the muscles has revealed only non-specific abnormalities. It seems likely that disturbances may arise at more than one level—neural, neuromuscular, or muscular—in the same patient. Pathological studies on this material are not yet complete.

Walton and Adams (1958) regard these patients as sufferers from polymyositis; indeed dermatomyositis has long been known to occur in association with malignant disease. We prefer to use the term carcinomatous myopathy, which carries no unsupportable implications as to the nature of the pathological process, when the evidence points to muscle as the site of the lesion. The title carcinomatous neuromyopathy may be reserved for those cases in which there is clinical or pathological evidence of lesions of both neural and muscular tissues.

Mental Changes

Mental disturbances have been prominent in seventeen of our patients. Apart from our brief observations elsewhere on this subject, Charatan and Brierly (1956) have described a form of toxic confusional psychosis, with lucid intervals, in association with carcinoma of the lung, and in the absence of secondary deposits. In none of our patients examined postmortem have cerebral metastases been found; nor have representative sections of the brain shown any microscopic infiltration. It is impossible to be certain that there may not have been such infiltration at some sites, but the long course in some cases makes this seem unlikely.

Fourteen patients have had dementia, rarely preceded by an episode of agitated depression. The form of the dementia has usually been simple, with progressive intellectual impairment and memory failure. Mood has generally been euphoric, but (as mentioned) agitation and depression have occurred. The tempo of the dementia has varied; commonly it has become apparent over a matter of months, but exceptionally the onset has been acute. It may be slight or severe. There has been no tendency towards remission, but our impression is that arrest can take place with no more than moderate deterioration.

We have seen one patient, not included in this series, in whom isolated fits were soon followed by status epilepticus. On recovery he was left with a serious confusional psychosis from which he made a substantial recovery over a period of several months. During this phase of improvement a carcinoma of the lung, previously unsuccessfully sought, became manifest. So far we have no pathological studies on this patient.

Dementia has been commonly associated with cerebellar symptoms (ten cases), but sometimes with sensory or mixed forms of peripheral neuropathy (three cases) or a myasthenic-myopathic picture (one case). Three further patients had gross hysteria, but we cannot be sure that this incidence is necessarily higher than in other forms of organic nervous disease.

In retrospect it seems possible that we have failed to record minor mental abnormalities in some of the earlier cases.

Investigations

Cerebrospinal fluid.—Abnormalities were found in the C.S.F of five out of eight patients with cortical cerebellar degeneration and in four out of seven with the encephalomyelitic form. The changes included lymphocytic pleocytosis, up to 48 cells per c.mm., increased protein (as high as 120 mg. per 100 ml.), and paretic Lange curves. No organisms were ever recovered on culture. The Wassermann reaction was always negative in blood and C.S.F. A raised protein content, rarely with cellular increase, was common in sensory and sensorimotor peri-

pheral neuropathy. The C.S.F. was normal in all patients with carcinomatous myopathy.

Other investigations.—A wide range of tests has been carried out on our patients. Although occasional abnormalities have been discovered in the pyruvate tolerance test and in the level of plasma-cholinesterase, these changes have been quite inconstant. There has been no electrolyte disturbance. Histochemical studies on muscle have been made in some of our patients by Bourne and Beckett (1957a and 1957b). Although three of the fifteen women in the series had myxœdema, the remainder have shown no sign of thyroid disorder, special tests being carried out in a few. Electromyograms and muscle biopsies have been regularly performed in appropriate instances.

Differential Diagnosis

Where cerebellar symptoms are prominent, distinction from other forms of cerebellar degeneration and from multiple sclerosis is required. Working in a general hospital, the carcinomatous form of subacute cerebellar degeneration is by far the commonest we see. In the diagnosis of peripheral neuropathy occult carcinoma should be considered when the patient is of appropriate age. Sensory neuropathy remains a rare manifestation of carcinomatous neuropathy, and also of diabetes mellitus. The neuromuscular disorders are the most difficult to differentiate: conditions which must be considered in diagnosis include myasthenia gravis, motor-neurone disease, thyrotoxic myopathy, dermatomyositis, and other myopathies of late onset. Sometimes the diagnosis can only be clinched at necropsy, because the carcinoma has been so small as to defy all attempts at detection.

Treatment

Treatment is directed towards the associated cancer. The treatment of the neurological syndromes has been disappointing. Physiotherapy is helpful in patients with neuromuscular disorders and neostigmine should be employed in the myasthenic cases. Cortisone is advised for patients with dermatomyositis. In our experience vitamin therapy has not been of value.

Theories of Causation

The ætiology of these neurological syndromes remains obscure. They are certainly not due to secondary deposits. Any explanatory theory must take account of the following facts.

1. Only a very small proportion of patients suffering from carcinoma develop neuromyopathy. Lennox and Prichard (1950) found that only 1·7% of 299 patients with carcinoma of the bronchus had peripheral neuritis. This was a retrospective survey, and it is possible that the figure would be somewhat higher if it included minor degrees of the disorder such as might be discovered if they were specifically looked for. Moreover, Lennox and Prichard's study did not deal with forms of carcinomatous neuropathy other than neuritis. If, to allow for all these additional instances, we multiply their figure by three we still have an incidence of only 5% among patients with lung carcinoma.

2. There is no relation between the size of the growth and the liability to neuromyopathy.

3. The incidence of neuromyopathy is much higher in lung carcinoma than in carcinoma elsewhere. Lennox and Prichard found no instance of peripheral neuritis in three hundred cases of carcinoma elsewhere than in the lung. Thirty-two out of our forty-two patients had lung carcinoma, though in only 14% of all cases of carcinoma is the primary site in the lung (Registrar General 1956).

Several possible explanations need to be considered.

Carcinotoxins.—If the neurological changes were the result of toxins produced by the carcinoma one would expect to find a correlation with the size of the tumour, which does not occur.

Infection.—We have previously discussed the possibility of virus infection (Henson et al. 1954). The apparently inflammatory changes (an encephalomyelitis) found in the mixed group, and also in single examples of cortical cerebellar degeneration and sensory neuropathy, have been mentioned. These changes have been so marked in some cases that the theory of virus infection must be seriously entertained; it certainly deserves further investigation.

Sensitisation.—The low incidence of these neurological disorders suggests the possibility of some additional constitutional process to which only a small proportion of the exposed population is liable. A process of sensitisation of particular nervous tissues, or the muscles, to some product of the tumour might play such a part. Modern immunological techniques may throw light on this.

Metabolic disorders.—Denny-Brown (1948) and Henson et al. (1954) have mentioned the possible role of nutritional disorders, particularly the implication of vitamin E or pantothenic acid. Leigh and Meyer (1949) also discussed this aspect. Apart from abnormalities of vitamin metabolism there must be many ways in which the activities of the nervous system could be disturbed, including interference with synaptic mechanisms. It is well known that an occult carcinoma may lead to cachexia without obvious interference with the intake and absorption of food. It is conceivable that a better knowledge of the mechanisms of cachexia might help us to elucidate the unexplained muscular wasting and weakness which appears to be myogenic. There is one further point. The Purkinje cells of the cerebellum are especially vulnerable, tending to degenerate in old age and in certain toxic and anoxic states. A metabolic disorder might be involved in their loss in carcinomatous neuropathy. Nevertheless, once again, if a tumour in some way deprived the body of essential nutritional factors or produced other metabolic changes, one might expect this effect to be correlated with the size of the growth.

Endocrine disorders.—The relatively high incidence of myxœdema in our series may be accidental. The fact that two of the women concerned had mixed forms of carcinomatous neuropathy, with encephalomyelitic changes, excludes any causal relationship. The third patient had myopathy, and here there might be a link. However, we have failed to demonstrate thyroid deficiency, or over-activity, in any of our other cases.

Conclusion

Carcinomatous neuromyopathy, and its relation to carcinoma and carcinogenesis, raises many questions. Recent work on the production of leukæmia and parotid tumours in mice (*Lancet* 1958) illustrates their complexity:

"Four essential conditions seem, on Gross's theory, to be needed for the development of leukæmia: (1) inherited susceptibility of the host, (2) the presence from birth of a leukæmogenic agent, (3) an activator that may be intrinsic (metabolic or hormonal) or extrinsic (physical or chemical), and (4) conditioning of the host to allow the activators to stimulate the pathogenic agent to produce leukæmia (or tumour)".

We are far from being able to apply these discoveries to man, but they may at least warn us against any facile interpretation of the nature of carcinomatous neuromyopathy. But clearly any light thrown on this would illuminate both the nature of cancer and the relation between the nervous system and the rest of the body.

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TREATMENT OF INTRACTABLE PAIN BY SUBARACHNOID INJECTION OF CARBOLIC ACID

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THE intractable pain of peripheral disease is usually transmitted over a number of nerve-roots. Hence, if it is to relieve such pain, the interruption of nerve conduction by surgical or chemical means may have to be so extensive that it leaves the patient with a severe disability. For example, in bilateral pain from pelvic malignant disease it may be necessary to interrupt conduction in all the posterior roots from the 10th thoracic root caudally—some twenty in all.

Treatment with the currently available long-acting anæsthetic agents, or with alcohol, may cause serious damage: thrombosis spreading from the site of injection can interfere with the blood-supply of the spinal cord, and this may lead to trophic changes in the structures deprived of their nerve-supply.

In a large series of patients undergoing nonoperative treatment for pain, Dundee (1957) found that just over half required analgesic or other drugs, because nerve-block was either inadequate or impracticable. When analgesics were not employed, the proportion of satisfactory results in cases of malignant disease was low—although any success here represented a considerable achievement.

In 1955, Maher reported that certain intrathecal solutions of carbolic acid abolished pain completely in some patients without adding to their disabilities. He also found that neurological deficits resulting from treatment were small and did not cause added inconvenience.

Carbolic acid had previously achieved considerable notoriety as a cause of damage to the spinal cord, both in cases where it was said to have been administered in extremely low concentrations in water or spirit and where (as a constituent of an antiseptic solution) it contaminated drugs injected intrathecally. Because of this, its application by the subarachnoid route was approached with great caution. I chose 'Myodil' as the solvent, in preference to glycerin; the action of myodil in the subarachnoid space is known, whereas that of glycerin is not. I also felt that the use of glycerin and carbolic acid together would make assessment of the cause of any complication unnecessarily difficult.

A patient with uncontrolled pain in the terminal stages of malignant disease was offered this treatment.

A tumour mass almost filled his pelvis; there was a dribbling urinary incontinence, and increasing weakness of both lower extremities. Three injections of 5% carbolic acid dissolved in myodil were given at 2-day intervals; they were so placed that they blocked all sensory roots from 2nd lumbar caudally. Pain was abolished and no additional neurological deficits could be discovered. When the patient died 10 days later from uræmia secondary to his disease, postmortem examination did not show any meningeal or other local reaction to the injected solution, and no damage in other organs could be attributed to it. It was impossible to say whether the degeneration present in the spinal cord had been aggravated by the phenol or was entirely due to the destructive action of malignant disease upon the posterior roots.

Three or four other patients with widespread malignant disease were treated similarly, the concentration of carbolic acid being increased from 1/20 to 1/15 without untoward effects.

There is never any doubt about the result. Pain either persists or is abolished. Occasionally pain conduction is easily suppressed in a number of roots, but for one reason or another a single nerve remains unaffected so that pain continues to be felt. This is classified as a failure.

Method

Carbolic-acid crystals can be dissolved either in myodil or in glycerin. The two solutions give different results.

Both solvents are hyperbaric, but glycerin is much more viscid. Myodil is radioopaque whereas glycerin is not. Myodil is dispensed in sterile ampoules for subarachnoid injection, while glycerin has to be sterilised immediately before use by heating to 160°C for an hour in a hot-air oven. It has been sterilised in an autoclave, but this was unsatisfactory.

0·5 g. carbolic-acid crystals are weighed out aseptically into a dry sterile 15 ml. bottle and sealed with a dry sterile rubber cap. Just before use 7·5 ml. of myodil is added to make a 1/15 solution, or 10 ml. of glycerin for a 1/20 solution.

Results are best when the solution is injected at the level of the roots carrying pain from the lesion. If introduced at a distance and allowed to run, the solution appears to lose potency by the time it reaches the affected roots. Very accurate positioning of the patient is necessary to concentrate the drug at the chosen level and to keep it there for about 30 minutes.

Carbolic Acid in Myodil

Carbolic acid is readily soluble in myodil. A 1/15 solution is non-corrosive to the skin even after long contact.

Subarachnoid injection in the lumbar and sacral regions and correct positioning of the patient are easy. As a maximum of 2 ml. is used, only three or four roots can be dealt with at one time. Larger quantities occasionally cause transient retention of urine.

Treatment in the mid-thoracic region is technically difficult, and fluoroscopy is required to position the carbolic-acid solution and to ensure that it remains in the desired position. In the cervical region the subarachnoid space is easily entered, and again the solution is positioned under X-ray control. As in the thoracic and upper lumbar regions, care must be taken to avoid damage to the spinal cord by the needle or the injection. The volume of solution injected may be increased to 3·5 ml. with safety.

Two days elapse between successive treatments, and the patient is advised to rest in bed for 24 hours.

Should the solution come into contact with the sensory roots of the 5th or 10th nerves, the patient either complains of paræsthesia followed by anæsthesia in the face, or of a "terrible feeling" and an uncontrollable tremor

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in the body. If the patient is immediately repositioned to remove the solution from the affected roots this feeling passes off completely in about an hour.

Within 20 seconds of successful injection pain is relieved, and there are rarely any subjective findings to indicate the extent of the block. The patient occasionally notices a stinging sensation for a few seconds, or there may be a transient reduction of sweating if he has had hyperidrosis. Superficial vasodilatation has never been observed, nor does the skin temperature or the skin resistance change. Sensation of touch, pinprick, vibration, proprioception, temperature, and tendon or muscle pain are unimpaired (except for slight occasional difficulty in distinguishing minor changes in warmth), and deep and superficial reflexes and motor power and tone are unaffected.

The only constant, positive, immediate sign by which the extent of the nerve-block could be measured was the response to intradermal histamine. There is a normal weal-and-flare response to histamine, but, within the area of the block, itch cannot be felt. The response is the same even if pain is unrelieved.

Carbolic Acid in Glycerin

This solution is used in a concentration of 1/20. It is more effective in relieving pain than the myodil solution, but some of its side-effects may be disadvantageous. Its use is therefore largely reserved for treating pain in the lowest sacral segments and for the management of severe flexor and extensor spasms associated with spinal-cord lesions.

TABLE I—RESULTS IN PATIENTS WITH MALIGNANT DISEASE

Site of lesion	Satisfactory	Unsatisfactory	Total
Pelvis (lumbosacral roots) ..	10	1	11
Abdomen (thoracolumbar roots)	3	2	5
Lung (thoracic roots)	3	2	5
Breast (thoracic roots) ..	6	2	8
Pharynx (cervical roots) ..	3	..	3
Bone metastases	3	1	4
Soft-tissue metastases	1	..	1
Malignant cutaneous ulcer ..	1	..	1
Totals	30	8	38

Immediately after injection there is a sensation of coldness followed by analgesia and weakness of the affected limb. This lasts for a few minutes; then motor power and sensation gradually recover over the next 24 hours. This solution is much more prone to cause temporary urinary retention than carbolic acid in myodil.

Superficial and deep reflexes vanish and never return. While resting muscle tone is permanently and considerably reduced, voluntary motor power is unaffected. The patient can walk quite well; but, if his attention is distracted, his legs may give way in spite of full motor power. Examination of cutaneous sensation and of muscle and joint position sense a week after treatment usually showed no abnormality, although sometimes there was an area of diminished acuity.

When glycerin was first used as a solvent it was autoclaved instead of being sterilised in a hot-air oven. Serious complications followed its use: injection caused severe pain which persisted for 10 days; and moderately severe, permanent weakness and anæsthesia developed in the affected territory. We suspected that the glycerin had absorbed water during autoclaving; and that carbolic acid, dissolved in this water, was liberated in high concentration into the cerebrospinal fluid. Since glycerin has been sterilised in the hot-air oven these alarming complications have never recurred.

TABLE II—RESULTS IN THE NON-MALIGNANT GROUP

Lesion	Total	Satisfactory	Unsatisfactory	Subsequent treatment of unrelieved patients
Spinal-cord disease with flexor spasms	3	1	2	Anterior rhizotomy
Posterior lumbar-disc "neuritis"	6	..	6	Cordotomy
Ischæmic pain in lower limb	1	..	1	Control of exercise, &c.
Postherpetic pain	2	..	2	Analgesics
Phantom-limb pain ..	2	2	..	..
Sacral chondroma	1	..	1	Cordotomy
Ankylosing spondylitis ..	1	1	..	..
Causalgia	1	1	..	..
—	17	5	12	—

Results

During 1957 fifty-five patients were treated for severe intractable pain by subarachnoid injections of carbolic acid dissolved in myodil or occasionally in glycerin. Several patients have been under observation for periods ranging from twelve to twenty-one months. Apart from the serious complications already mentioned, no neurological or other damage has resulted from the injections.

Tables I and II show the results in patients with malignant and non-malignant disease respectively. The thirty-eight patients who suffered from malignant disease were unselected: in this group there were eight failures (table III). The non-malignant group was selected with some care, but most of the results were disappointing.

Spinal-cord disease with flexor and extensor spasms was treated without success using carbolic acid dissolved in myodil. After the observation that reflex activity disappeared permanently when glycerin mixtures were used, this solution was tried in the management of a patient with severe flexor spasms. The spasms were abolished and residual sensation was unimpaired. The bladder became hypotonic.

In six patients who had severe lumbosacral "neuritis" following sequestrated lumbar-disc protrusion, fibrosis of the nerve-roots probably prevented adequate penetration by the solution.

Two patients with postherpetic pain and hyperæsthesia were treated successfully for the latter complaint. The treatment was not expected to abolish the pain, which is caused by a lesion in the central nervous system not accessible to this form of management.

Both patients with painful phantom limbs had already had two cordotomies: in each case pain returned after a considerable period of relief.

The patients with sacral chondroma and ankylosing spondylitis were not expected to derive much benefit except when at

TABLE III—SUBSEQUENT TREATMENT OF UNRELIEVED PATIENTS WITH MALIGNANT DISEASE

No.	Lesion	Nerve-roots involved	Subsequent treatment
1	Carcinoma of cæcum	Lumbosacral plexus	Heavy sedation
2	Abdominal carcinomatosis	All below 8th thoracic	Relief for six weeks: then rapid deterioration and death
3	Ureteric carcinoma	Lumbar	Cordotomy
4	Metastatic mammary carcinoma	Bilateral 2nd lumbar	Hypophysectomy: pain relieved
5	Mammary carcinoma	Brachial plexus	Cordotomy: also failed
6	Mammary carcinoma	Brachial plexus	Relief for six weeks
7	Lung carcinoma	Brachial plexus	Brachial-plexus block: pain relieved. 1% carbolic acid in water
8	Carcinoma of bronchus: chest-wall involved	Thoracic	Peripheral nerve-block: pain not relieved. 1% carbolic acid in water

rest. During movement the nerve-roots were being dragged over the surface of a hard tumour in one case and the diseased vertebral column in the other. Each patient obtained fair relief from pain at rest.

Discussion

Myodil and glycerin modify the rate at which carbolic acid is released into the cerebrospinal fluid; and the concentration reached by carbolic acid depends on the rate of its release, its absorption by the tissues, and its removal by the blood-stream. Unlike aqueous solutions of carbolic acid, neither mixture is destructive, or readily absorbed when left in contact with the skin.

2 ml. of a 1/15 myodil solution was added to 60 ml. of cerebrospinal fluid in a conical flask. The solution was injected from a syringe through a lumbar-puncture needle. The flask was so tilted that the mixture formed a pool with an interface about the size of a shilling. After half an hour the flask was shaken once and 2 ml. of supernatant cerebrospinal fluid was removed for analysis. It contained the equivalent of 32·5 mg. carbolic acid per 100 ml. of cerebrospinal fluid, or about a quarter of the carbolic acid originally dissolved in the myodil.

A patient who was undergoing treatment for saddle pain had a lumbar puncture carried out at the second lumbar interspace. 2 ml. of a 1/15 carbolic-acid/myodil solution was then injected and the needle rinsed free of all traces of the solution but left in position. The patient was very steeply tilted to localise the solution to the sacral sac. 2 ml. samples of cerebrospinal fluid were withdrawn through the needle 5 and 10 minutes after the injection. They contained the equivalent of 27·5 mg. and 15·7 mg. of carbolic acid per 100 ml. respectively. These figures are in agreement with those reported by Nathan and Scott (1958).

As these specimens were withdrawn at some distance above the carbolic-acid/cerebrospinal-fluid interface, they did not show the concentration of aqueous carbolic acid at the level of the neurological block. Indeed, there was no evidence that any physiological disturbance was produced by these concentrations of carbolic acid dissolved in cerebrospinal fluid. Pain was relieved in the sacral segments only, the lumbar roots being apparently unaffected.

Experimental nerve-blocks using the 7·5% myodil solution of carbolic acid showed that it corresponded roughly to a 0·5% aqueous solution. The block was reversible up to about 20 minutes, after which it became permanent. The solution appears to affect fibres of all modalities in a diffuse manner, the fine fibres being affected before the larger ones.

Since most patients died at home, postmortem material has been difficult to obtain; but in the material available it was impossible to identify specific lesions of the spinal cord or nerve-roots that could be attributed to the carbolic-acid solutions. Some patchy degeneration in the posterior columns may have been due to the action of carbolic acid upon the nerve-roots.

Although no local reaction to the injected material was seen at necropsy, four patients had well-marked arachnoiditis at the site of injection when the spinal cord was exposed 2–4 weeks after treatment. The arachnoid membrane was opaque, pink, and adherent to the dura and the underlying spinal cord for a distance of about two inches. This was the area that had been covered by the carbolic acid solution.

So far, no surviving patient has shown any clinical evidence of adhesive or obliterative arachnoiditis. Nevertheless, until more information has been obtained, it would seem prudent to restrict the use of intrathecal carbolic-acid solutions to the relief of pain in malignant disease and a few other carefully selected lesions.

The site of action of the drug appears to be the posterior-root ganglion or the region of the proximal neuroganglionic junction. If a block of the sacral or lumbosacral roots is required, they are accessible over a considerable distance in the caudaequina. Under fluoroscopic control these roots can be bathed with the solution proximal to the ganglia; but this abolishes the pain for only a few hours. If the block is repeated a few days later, with the solution placed around the ganglia, permanent relief results. The failure to produce a permanent block when these solutions act on the nerve alone may simply be due to a rapid diffusion of carbolic acid into the surrounding cerebrospinal fluid. When the solution is allowed to travel more distally, so that it enters the required root pockets, there should be less tendency to such diffusion, and an effective local concentration of carbolic acid may develop.

Extradural injection of either solution has never succeeded in producing permanent abolition of pain when subarachnoid injection has failed. If a rise of limb temperature or electrical skin resistance, vasodilatation, absence of sweating, or a Horner's syndrome are the signs of an efferent sympathetic block, then this has never followed injection of either solution.

Occasionally severe paroxysmal pain, similar to that of trigeminal neuralgia, develops in the area of the block. This is rare within the first 24 hours. The attacks become less frequent and disappear in a week or 10 days: there are no associated neurological signs.

One patient had a recurrence of pain 6 months after treatment. It was sufficiently severe to require large doses of pethidine for 24 hours, and then disappeared as abruptly as it had appeared.

Carbolic-acid solutions seem to act on the sensory root at, or just proximal to, the ganglion: they cause permanent destruction of part of the root, the smallest fibres being affected more readily than the larger ones. The large sensory fibres, whose function is easily assessed by clinical testing, as well as motor and sympathetic efferent fibres, are apparently unaffected.

As a result of this, what appears to be a selective block of pain perception from somatic disease develops, though the patient can still feel the pain of pinprick, acute inflammation, or other external stimulus.

Invasion of the nerve-root in its intradural part by fibrous tissue or tumour, or the matting together of roots in arachnoiditis, prevents adequate penetration by carbolic acid in the concentration used, so that pain persists. Inflammatory swelling of the nerve-roots may fill the root pockets and prevent the carbolic solution from being trapped there. In these circumstances it is probable that a sufficiently high concentration of carbolic acid will not accumulate in the cerebrospinal fluid around the nerve-roots for the time necessary to produce a permanent block.

When the painful stimulus is increased beyond a certain level, pain which had been previously abolished by the block is again felt as intensely as before. (The patient with the sacral chondroma and those with disease of the vertebral column showed this very clearly.) Facilitation of sensory conduction by acute inflammation or other injuries will also bring about a temporary resurgence of symptoms. However, once the inflammatory lesion is treated, this pain will disappear.

Carbolic acid dissolved in glycerin is more potent than carbolic acid dissolved in myodil: being more easily released into aqueous solution, it allows a higher concentration of carbolic acid to develop in the cerebrospinal

fluid. Nevertheless, because of its tendency to produce minor neurological deficits, its use should be restricted, with few exceptions, to treating pain in the lowest sacral roots.

Carbolic acid dissolved in glycerin reduces the tone of resting muscle and abolishes superficial and deep reflexes by sensory block. Voluntary motor power is unaffected. This solution has been used successfully in treating the involuntary spasms of spinal-cord disease, with preservation of residual cord function.

Summary and Conclusions

55 patients with severe intractable pain or involuntary movements due to spinal-cord disease were treated by intrathecal injection of carbolic acid dissolved in myodil or glycerin. They have been under observation for periods up to twenty-one months.

The method appears to be safe when used as described, but a much longer follow-up period will be required to exclude the possibility of serious delayed neurological complications. Such complications may take months, or even years, to develop; but, once established, they cannot be reversed. For this reason intrathecal carbolic acid should be used mainly in treating the pain of malignant disease until we can be reasonably certain that it does not cause serious late complications.

I wish to thank Professor N. M. Dott for his encouragement during this investigation, and for the facilities which were made available so that patients could be admitted for treatment; and Dr. J. Gillies for his help in preparing the manuscript.

I should also like to thank my radiological colleagues for their invaluable assistance in the management of many of these unfortunate people.

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THE PROTEINURIA OF RENAL TUBULAR DISORDERS

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SERUM proteins have been studied extensively, but urine proteins, other than those occurring in multiple myeloma and renal disease, have had less attention. This may explain why the inaccurate term "albuminuria" is still in common use for any proteinuria.

Reported here are analyses by paper electrophoresis of the urine proteins excreted in a variety of conditions—particularly renal tubular disorders. Interest in the latter was aroused by Prof. C. E. Dent, who asked us to investigate the urine of a case of the adult Fanconi syndrome which gave a reaction to the sulphosalicylic-acid heat test suggesting the presence of Bence Jones protein. On paper electrophoresis a pattern not previously encountered was found, and this was later demonstrated in other cases of the Fanconi syndrome and also in related disorders. It appears to be associated with renal tubular dysfunction.

Material and Methods

Fresh urine specimens were obtained from 21 patients suffering from diseases known to be associated with renal tubular dysfunction. For control purposes specimens were also obtained from:

39 patients with more common causes of proteinuria (type-I nephritis 2, type-II nephritis 12, chronic nephritis 3, amyloid nephrosis 2, mercurial nephrosis 2, diabetes mellitus 3, congestive cardiac failure 9, pre-eclamptic toxæmia 2, fever due to upper respiratory infection 1, disseminated lupus erythematosus 1, renal calculi with chronic urinary infection 1, and cirrhosis of liver 1).

40 patients with multiple myeloma.

7 healthy adults.

In one of the 21 cases (case 11) a final diagnosis has not been made, but there is biochemical evidence of renal tubular dysfunction.

The total protein was estimated by a modified turbidometric method (Kingsbury et al. 1926), and the urine was then concentrated where possible to a total protein content of approximately 3 g. per 100 ml., by dialysis at 4°C in 'Visking' tubing against a saturated solution of gum-acacia. The proteins were then examined by paper electrophoresis using the qualitative method of Flynn and de Mayo (1951) and in selected cases, including all the patients with tubular disorders, the patterns were made quantitative by scanning in an electrophoretic scanner.

The results have been recorded using a variable number of plus signs since quantitative procedures applied to filterpaper electrophoresis are subject to considerable error arising from variation of the dye-binding properties of proteins, deviation from Beer's law, and the uncertainties in deciding the limits of each peak and the position of the base line (Crook et al. 1954, Franglen and Martin 1954).

TABLE I—TYPICAL ELECTROPHORETIC PATTERNS OF URINE PROTEINS (AFTER CONCENTRATION) IN CONDITIONS COMMONLY ASSOCIATED WITH PROTEINURIA.

Diagnosis	No. of cases	Total protein (mg. per 100 ml.)	Albumin	Globulins			
				α_1-	α_2-	β-	γ-
Acute nephritis (type I) ..	2	70–80	+++	+	+	+	+
Nephritis (type II) ..	12*	150–7300	+++	+	tr	++	tr
Chronic nephritis	3	70–300	+++	+	+	+	+
Amyloid nephrosis ..	2	180–750	+++	+	tr	++	tr
Mercurial nephrosis ..	2	1500	+++	+	tr	++	tr
Diabetes mellitus	3	5–60	+++	++	+	+	tr
Congestive cardiac failure ..	3	150–1000	+++	tr	tr	+	tr
	6	<5–60	++	+	+	+	+
Severe pre-eclamptic toxæmia	2	10–1250	+++	+	tr	+	tr
Fever (virus upper-respiratory infection)	1	150	+++	tr	tr	tr	tr
Renal calculi with chronic urinary infection ..	1	45	+++	tr	tr	+	+++
Cirrhosis of liver	1	10	++	tr	+	+	++
Disseminated lupus erythematosus	1	20	+++	+	tr	tr	+++

+++ corresponds to protein percentage above 30.
++ " " " " of 21–30.
+ " " " " of 11–20.
tr (trace) " " " " below 11.
* Urines from 4 of these did not require concentration before electrophoresis.

Results

The findings are summarised in tables I and II, and representative photographs in fig. 1.

The electrophoretic pattern found in healthy adults is faint because little protein is present. The bands are indistinct and some protein tends to remain at the origin, presumably because of denaturation during the long concentration process. Quantitative assessment is therefore unsatisfactory, but albumin is clearly discernible as the largest single fraction, though the sum of the globulins appears to be greater.

TABLE II—ELECTROPHORETIC PATTERNS OF URINE PROTEINS (AFTER CONCENTRATION) IN CONDITIONS ASSOCIATED WITH RENAL TUBULAR DYSFUNCTION

Case	Diagnosis	Glycosuria	Aminoaciduria	Total protein (mg. per 100 ml.)	Albumin	Globulins			
						α_1-	α_2-	β-	γ-
1	Adult Fanconi syndrome (Dent and Harris 1956)	++	+++	40	+	tr	++	++	+
2	" " "	++	++	50	++	tr	++	++	+
3	" " "	++	+++	20	+	tr	+++	+++	+
4	" " "	++	+++	20	tr	tr	++	++	++
5	" " "	++	+++	80	tr	tr	++	+++	++
6	" " "	++	++	20	+	tr	+++	+	+++
7	" " "	+	+	<5	+++	tr	+	+	++
8	Wilson's disease	0	Normal	N.D.	++	+	+	+	++
9	" "	0	++	N.D.	+++	tr	tr	tr	++
10	" "	+	+	<5	+++	tr	+	+	++
11	Idiopathic nephrocalcinosis	0	Normal	60	++	tr	++	++	+
12	Renal tubular acidosis with nephrocalcinosis	0	Normal	7	+++	+	tr	+	+
13	Congenital galactosæmia—untreated	++[1]	+++	50	tr	tr	+++	+	+
	" " after 2 weeks of galactose-free diet	+[1]	+	20	+	++	+++	++	tr
	" " after 6 months of galactose-free diet	0[2]	Normal	N.D.	++	tr	tr	+	+++
14	Pituitary diabetes insipidus	0	Normal	150	++	tr	+	++	++
15	" " "	0	..	N.D.	← traces only →				
16	Chronic potassium depletion—purgative addict	0	Normal	<5	++	tr	tr	+	++
17	H.-disease (Baron, Dent, Harris, Hart, and Jepson 1956)	0	+++	N.D.	+++	tr	tr	tr	tr
18	Organic-aciduria syndrome (Lowe, Terrey, and MacLachlan 1952)	0	++	80	+	tr	+++	++	+
19	Acquired renal tubular rickets	0	+	15	+	tr	++	++	+
20	Congenital hypoplastic kidneys with episode of acute tubular necrosis (recovered)	+	++	15	+	tr	++	++	++
21	Cystinuria	0	+++	N.D.	← traces only →				

N.D. = none detected. 1. Galactose + + also. 2. No galactose.

Except for those with multiple myeloma and conditions associated with a markedly raised γ-globulin in the serum, the patients with conditions other than renal tubular disorders all have albumin as the predominant protein in their urine. In a given condition there is some variation in the pattern, but as a rule the proteins of lower molecular weight predominate over the α_2- and γ-globulin fractions. In multiple myeloma usually a solitary peak is found in the β- to γ-globulin region, but sometimes small amounts of albumin and other globulin fractions are also present.

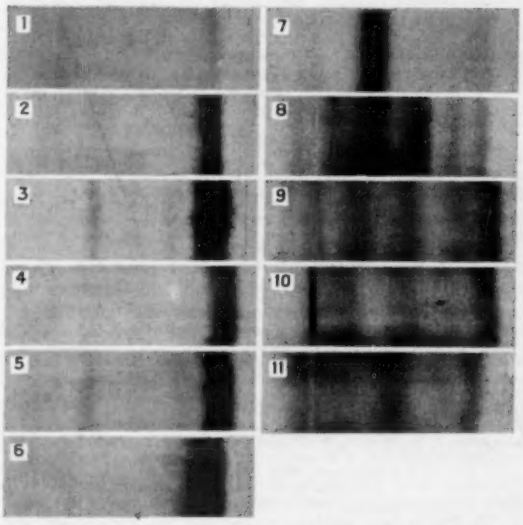

Fig. 1—Representative paper-electrophoretic patterns of urinary proteins from a healthy adult, from six patients with common causes of proteinuria, and from four with renal tubular disorders:

1. Normal healthy adult
2. Chronic nephritis
3. Nephrotic syndrome
4. Acute nephritis (type 1)
5. Congestive cardiac failure
6. Fever (virus upper-respiratory infection)
7. Multiple myeloma with β-Bence Jones protein
8. Adult Fanconi syndrome
9. Acquired renal tubular rickets
10. Congenital hypoplastic kidneys with episode of acute tubular necrosis (recovered).
11. Organic aciduria syndrome of Lowe et al. (1952)

The patients with renal tubular disorders who have 15 mg. (or more) protein per 100 ml. of urine all show a distinctive pattern with α_2-globulin in concentration approximately equal to, or greater than, albumin. We call this the " tubular proteinuria " pattern. In 10 of the 13 cases with proteinuria exceeding 15 mg. per 100 ml. the amount of α_2-globulin is greater than that of albumin, and in 3 of these 10 cases it is the largest fraction of all. Often much β-globulin is also present, and there may be a relatively high proportion of γ-globulin. In some cases protein peaks with mobilities akin to that of fibrinogen were also found; where present these have been included in the γ-globulin value.

No simple quantitative relation is apparent between this tubular proteinuria, and other abnormalities such as aminoaciduria or glycosuria, but the more gross the tubular dysfunction the more likely is the occurrence of this type of proteinuria. Fig. 2 illustrates the gradual reversion of the urine-protein pattern to normal in a case of congenital galactosæmia given a galactose-free diet.

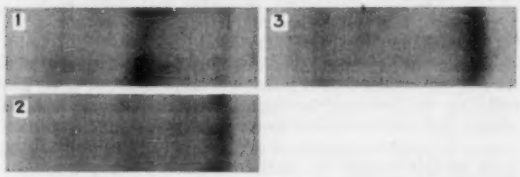

Fig. 2—Patterns of urinary proteins from a case of congenital galactosæmia showing transition from tubular proteinuria to normal on treatment with galactose-free diet:

1. Before treatment
2. After two weeks' treatment
3. After six months' treatment

In this case tubular proteinuria can be correlated with aminoaciduria and glycosuria.

Discussion

In the urines from healthy adults our findings are similar to those of Rigas and Heller (1951) and Boyce et al. (1954). In some we appear to find more γ-globulin, as have Slater and Kunkel (1953).

In the diseases other than renal tubular disorders our findings agree very well with those of others (Longsworth and MacInnes 1940, Luetscher 1940, Blackman and Davis 1943, Hauser 1953, Jahnke and Scholtan 1953, Schmidt 1953, Slater and Kunkel 1953, Soulier 1953, Wiedermann 1953, Boyce et al. 1954, Feruglio and Rimini 1954, Wunderly and Caspani 1954, Moeller and Steger 1955, Sellers and Marmorston 1956). None of these conditions, except multiple myeloma, show a diagnostic urine pattern.

The proteinuria of renal tubular disorders may differ markedly from that of all other conditions. Apparently, however, the typical tubular proteinuria pattern, with α_2- and sometimes β-globulins as major components, occurs only when the proteinuria exceeds a certain level, possibly around 15 mg. per 100 ml. This pattern does not seem to have been recognised previously, possibly because tubular disorders are relatively rare.

Parviainen et al. (1951), in their electrophoretic study of proteinuria of late pregnancy, include one case of eclampsia where the concentration of α_2-globulin exceeded that of the albumin. This patient died with severe oliguria and may very well have had acute tubular necrosis. Other studies of urine proteins in pregnancy toxæmia do not include such a finding (Del Bianco 1955, Prill and Steger 1955), but some authors unfortunately do not differentiate the α_1- and α_2-globulins (Suenderhauf and Wunderly 1953). In 2 of the 57 cases of proteinuria investigated by Moeller and Steger (1955) the concentration of α_2-globulin present in the urine was equal to that of albumin. In these patients, too, tubular function may well have been impaired, for one had pyelonephritis and the other Wilson's disease.

Our results in the tubular disorders cannot be attributed to alteration of the proteins during their handling; indeed, many of the specimens required less concentration than those from the patients with other conditions. Moreover we have shown that the electrophoretic pattern of serum diluted and then concentrated by this method appears unaltered. Further, repeated observations have been made on some of the patients over the course of a year and the findings have proved reproducible.

Many of the urines showing tubular proteinuria were tested with the classical heat test (Harrison 1957) but in none did the protein behave like Bence Jones protein. Some gave a positive result with the sulphosalicylic-acid heat test (Cook 1951), but so did some of those from cases of non-tubular proteinurias.

The origin of the tubular proteinuria is obscure.

The superficial resemblance of the pattern, in some cases, to that of serum might suggest that a serum exudate is being added to the urine; but the percentage of albumin was much lower than in serum, and in only 1 case was there evidence of urinary infection. Conceivably the kidney might be clearing abnormal plasma proteins; if so, one would expect these to be of lower molecular weight as in many of these cases the plasma and serum show no abnormality on electrophoresis.

As there is good evidence for tubular reabsorption of both albumin and globulin (Rather 1952, Hardwicke and Squire 1955), it seems more probable that the proteinuria acquires its distinctive pattern from impaired tubular reabsorption of certain normal plasma proteins leaking through abnormal (or even normal) glomeruli. The fact that this type of proteinuria has been found only in disorders associated with deranged tubular function, and that in the case of congenital galactosæmia under treatment the protein pattern reverted to normal in parallel with the returning ability to reabsorb glucose and amino-acids, strongly suggest that the tubules themselves are involved.

The absence of this distinctive proteinuria in some of the diseases investigated, and its inconstancy in others, could be explained by assuming that dysfunction at a particular locus of the tubule is necessary to produce the abnormality. An alternative explanation might be that in these cases the load of protein filtered off by the glomeruli is still within the lowered capacity of the tubules to reabsorb proteins of high molecular weight.

Whatever its origin, this distinctive proteinuria has a definite association with certain renal tubular disorders and as such may be of diagnostic value.

The higher proportion of globulins in the proteinuria of renal tubular disorders may also bear some relation to the subsequent renal failure in certain cases. Thus Blackman et al. (1941) and Blackman and Davis (1943) have suggested that globulinuria is particularly associated with deposition of hyaline material within the tubules and glomeruli and a progression to renal failure, and Lasch (1953) has correlated globulinuria with a poor prognosis in various forms of nephritis.

Summary

Urine proteins from various conditions have been examined by paper electrophoresis.

A distinctive urine pattern characterised by a relatively high content of α_2-globulin has been recognised. This type of proteinuria appears to be peculiar to renal tubular disorders.

Work included here was done during the tenure by one of us (E. A. B.) of a grant from the research fund of University College Hospital. We wish to thank the physicians at University College Hospital, and also Prof. J. N. Cumings (cases 8, 9, and 10) and Dr. S. W. Stanbury (cases 1 and 7) for providing us with specimens, Prof. C. E. Dent for data on aminoacid excretion and much other help, and Mr. A. C. Lees for the photographs.

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SENSITIVITY TO SUXAMETHONIUM
APNŒA IN TWO BROTHERS

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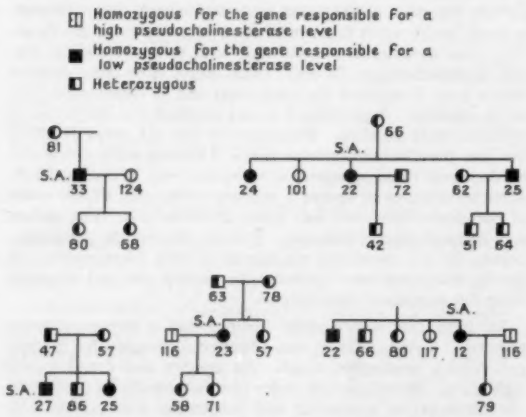
IT is generally recognised that suxamethonium is a very useful muscle relaxant to the anæsthetist. Its short action is due to its rapid breakdown by pseudocholinesterase. There is a proportional relationship between the duration of muscular relaxation and the concentration of the pseudocholinesterase in the plasma. If the level of this enzyme is low suxamethonium no longer behaves as a short-term relaxant. The duration of paralysis of the respiratory muscles will be prolonged and apnœa can become a serious and embarrassing complication of anæsthesia.

It is impracticable to examine the plasma-pseudocholinesterase level of all patients likely, or even known, to receive suxamethonium. Liver disease is associated with a fall in pseudocholinesterase level. Like the albumin of the plasma so the pseudocholinesterase seems to be produced by the liver and its level can be used as an index of liver function. In this hospital the pseudocholinesterase level is estimated routinely in patients with liver disease who come to operation. When the pseudocholinesterase level is low the anæsthetist is informed and avoids suxamethonium or gives it in a precalculated low dose.

It is also known that very severe malnutrition is associated with a low pseudocholinesterase level: such malnutrition is rare in this country. If a patient's debility is as gross as in severe malnutrition in times of famine, he is unlikely to be considered fit for operation.

The pseudocholinesterase level can also be low when anticholinesterases have been administered. We see a few patients each year who have low cholinesterase concentrations because of insecticide poisoning. Should such patients come to operation suxamethonium must either be avoided or given with the greatest care. A commoner cause of a transient inactivation of pseudocholinesterase is the excessive administration by the anæsthetist or surgeon of drugs with anticholinesterase activity such as cocaine, procaine, and lignocaine. It has recently been shown that the ganglion-blocking drugs trimetaphancamphorsulphonate ('Arfonad') and 'Trophenium' (phenacylhomatropinium chloride) are powerful cholinesterase inhibitors.

An entirely unpredictable cause of a low cholinesterase level is a genetically determined deficiency of the enzyme. When drawing attention to this inborn error of metabolism we mentioned six families (Lehmann and Ryan 1956). Allott and Thompson (1956) reported another family. An extensive survey for this abnormality has been carried out by Kalow and Staron (1957). They defined pseudocholinesterase levels by the esterase units and by an inhibition-characteristic which they call the "dibucaine number". According to Kalow and Staron this index in patients with low pseudocholinesterase activity enables the idiopathic group to be distinguished from those with liver disease. We have now examined the inheritance of this defect in 14 families. The gene seems to be of different expression in different families. A single gene may be associated with a fairly low pseudocholinesterase level but the severe deficiency of pseudocholinesterase is more typical of what seems to be the homozygous state (see accompanying figure).



Representative family trees* of "suxamethonium apnœa" patients (marked S.A.) with idiopathic low pseudocholinesterase levels. Figures indicate level of plasma-pseudocholinesterase. The inheritance of the enzyme level is interpreted as finding expression in the three phenotypes indicated. Levels >90 units normal homozygotes. Range 61–90 includes both normal homozygotes and heterozygotes, range 36–60 heterozygotes, and <36 abnormal homozygotes. It is possible that the last range will have to be subdivided: <20 abnormal homozygotes, 20–35 including both abnormal homozygotes and heterozygotes. At present there is no proof for this contention.

* These family trees form part of a survey, which it is hoped will be published by one of us (H. L.) in collaboration with Miss E. Ryan and Miss V. Patston. We are grateful to Miss Ryan and Miss Patston for permission to present these family trees here.

Case-records

A man of 49 was admitted to hospital with a history of increasing dyspepsia. On the morning of admission he had symptoms and signs suggestive of a perforated peptic ulcer. The patient was small but in fair condition, and an exploratory laparotomy was decided upon. Anæsthesia was induced with thiopentone 600 mg., and the patient was lying with a head-up-tilt. A brief apnœa ensured during which oxygen inflation was carried out. On the return of respiration suxamethonium 30 mg. was given and with complete relaxation a cuffed orotracheal tube was passed. As respiratory movements did not begin again, artificial respiration with nitrous oxide and oxygen was begun and the operation started. Laparotomy revealed a mass in the left iliac fossa but no abnormality in the upper abdomen. A transverse colostomy was advanced and the mass drained. Complete flaccidity persisted for 2 hours: then small gasping respiratory movements were noticed. These increased in amplitude and after 30 minutes of assistance were adequate for the patient's respiratory requirements. Subsequent recovery from the anæsthetic was uneventful. Various suggestions were put forward to explain the prolonged apnœa; none seemed entirely adequate.

3 weeks later it was necessary to perform a second laparotomy for small-bowel obstruction. Anæsthesia was induced as before, using less thiopentone but the same amount of suxamethonium (30 mg.). The duration of the apnœa and recovery from it were the same as on the previous occasion. Small-bowel adhesions to the abscess mass were found. The mass was now

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smaller and seen to be due to diverticulitis of the pelvic colon. The adhesions were divided and the abscess again drained.

The clear association of this second incident with the use of suxamethonium led to the suggestion that there might be a relationship with the cholinesterases. The pseudocholinesterase level was found to be 12 units (normal 60–120 units). Instructions were given that this abnormality should be recorded in red ink on the outside of the patient's notes.

18 months later this man (now 50) was readmitted for elective resection of the colon and anastomosis. He had been in good health apart from mild recurrent attacks of diarrhœa. This time anæsthesia was induced with thiopentone 750 mg. and suxamethonium 50 mg. The larger dose was used to obtain good conditions for intubation and to demonstrate the art to students. A prolonged apnœa resulted and the previous episodes were recalled. Reference to the old notes revealed the low pseudocholinesterase level. Unfortunately there was no comment drawing attention to it, not even in ordinary ink. After 90 minutes of apnœa a solution containing 83,000 units of pseudocholinesterase was given intravenously. The apnœa was immediately terminated. Shortly afterwards suxamethonium 25 mg. produced an apnœa of only 10 minutes. A partial colectomy was uneventfully carried out and recovery from the anæsthetic was normal.

In 1953 this man's elder brother had a hypernephroma removed. 3 years later he was admitted to hospital for investigation of a productive cough. An opacity was found in the right lung. Bronchoscopy under general anæsthesia confirmed the diagnosis of a tumour and lobectomy was carried out. Histology favoured secondary neoplasia. At the time of bronchoscopy the patient was in good health. Anæsthesia was induced with thiopentone 500 mg. immediately followed by suxamethonium 40 mg. Apnœa lasting 45 minutes ensued and nikethamide 10 ml. was given with immediate improvement (Richards and Youngman 1952). The patient began breathing with a " square type " of wave form and clinically inadequate excursion. Assisted respiration was continued for over 2 hours when respiration returned to normal and recovery was uneventful. Anæsthesia was normal during a previous nephrectomy and a later lobectomy. On both occasions a competitive-type blocker (non-depolariser) was used. An estimation of the pseudocholinesterase showed the low level of 28 units.

Discussion

These experiences illustrate the need to warn the anæsthetist of the discovery of a low pseudocholinesterase level. The first patient who had a prolonged apnœa during operation was found to have a low pseudocholinesterase level in the plasma. At operation 18 months later he had a further prolonged apnœa when given suxamethonium 50 mg. Pseudocholinesterase (' Cholase ') is known to protect against apnœa when given before suxamethonium is administered (Evans et al. 1953, Calvert et al. 1954). It is of interest that pseudocholinesterase seems also to be capable of terminating such apnœa.

Borders et al. (1955) describe an immediate effect of pseudocholinesterase injection in a patient with apnœa who had received suxamethonium. This they believe might have been pure coincidence, and they state that in several other such patients no improvement was noted. Their observations—made on patients with normal pseudocholinesterase levels, in whom the apnœa was therefore not primarily due to deficiency of this enzyme—are not comparable with the present experience.

In 1952 one of us (H. L.) recommended the transfusion of whole blood (preferably fresh) in true suxamethonium apnœa. This advice has often been followed but it is difficult to evaluate the results scientifically. The blood is usually given when the paralysis has lasted for some time and a favourable response to blood-transfusion could either be post hoc or propter hoc. Nevertheless there has been a remarkable coincidence between transfusion and recovery.

It is often difficult to understand why patients with an identically low pseudocholinesterase level (of, say, 25 units) show a varying duration of apnœa following the same dose of suxamethonium: the duration may vary from no excessive prolongation to very prolonged apnœa. Some of these differences may be due to secondary factors operating after a suxamethonium apnœa has set in. These additional factors must be assessed from patient to patient. Kalow and Staron (1957) showed that the dibucaine number helps to discriminate between the idiopathic and hepatic types of low pseudocholinesterase levels. However up to now we have found no difference in their action on suxamethonium by the two types of sera which show the same relative activity as when determined with acetylcholine as the substrate. Lastly, the plasma-cholinesterase is only a part of the total pseudocholinesterase of the body. Indeed, it may be wrong to assume too close a parallelism between the circulating enzyme and that fixed in the tissues.

Three years after the first patient responded to suxamethonium with a prolonged apnœa his brother had the same experience. Clearly, whenever individuals are discovered to be unduly sensitive to suxamethonium a search for a low pseudocholinesterase level should be made; and if such a condition is found without environmental cause, the investigation should be extended to the patient's family, particularly to the siblings (see figure).

Summary

Two brothers are described who had a low plasma-pseudocholinesterase level and both had (one of them repeatedly) a prolonged muscular paralysis following the administration of suxamethonium. In one brother the apnœa was cut short after 90 minutes by injection of pseudocholinesterase.

Whenever it is known that a person has a low pseudocholinesterase level, suxamethonium apnœa may be avoided by recording clearly this finding on the top of the patient's notes. If the low level of the enzyme is idiopathic the relatives, particularly the siblings, should be examined for a low level of the enzyme.

Our thanks are due to Sir James Paterson Ross, Mr. O. S. Tubbs, and Mr. Douglas Robertson, for permission to use the case-notes of patients under their care at St. Bartholomew's Hospital. We are also indebted to Mr. George Ellis for providing certain of the anæsthetic details and to Dr. E. B. McLean, of Cutter Laboratories, Berkeley, California, for a gift of ' Cholase '.

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" The fact is that in the evolution of a complex activity like medical education most decisions are made empirically. Possibly some can never be made rationally, but it is conceivable that the design of a building, the organization of the curriculum, the selection of the faculty, and the composition of the student body could be influenced by better knowledge of all that is involved in the educational process. There is a growing awareness that the way in which many decisions are reached is counter to the logic of a scientific institution such as a university medical school."—Annual report of the Commonwealth Fund, New York, 1958, p. 10.

SKIN FRAGMENTS REMOVED BY INJECTION NEEDLES

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THIS study arose from curiosity: when a hollow needle is thrust through the skin how often does it core out a fragment of tissue? Trial experiments with a piece of skin removed at operation showed that this occurred very frequently, and an investigation of the incidence, the cause, and the possible fate of these skin fragments was undertaken.

Experimental Method

Portions of skin and subcutaneous tissue were obtained at necropsy or from surgically excised material and used as soon as possible. Care was taken that the skin was neither scarred nor atrophic. As a rule skin from the anterior abdominal wall was used, but the results did not vary significantly when it was taken from other sites. In one instance we were able to perform a small series of tests on forearm skin during an operation on that arm; the results in vivo were similar to those obtained in vitro.

Excess fat was removed from the specimen until the subcutaneous layer was about the same thickness as the skin. The needle to be tested was thrust through both layers, and, while it was in situ, any excised fragments were syringed out with water into a watch-glass lying on a dark background. Only fragments large enough to be identified by the naked eye were accepted as positive results. At first it was thought that there might be some confusion between skin and fat, but these could be readily differentiated by colour and texture and the difference was confirmed histologically. In fact the great majority of the particles were skin (fig. 1); the occasional fat fragments and free fat globules were disregarded in the counts.

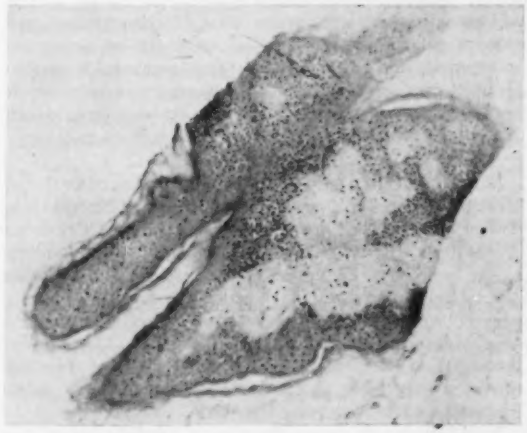

Fig. 1—Skin fragment, excised by a B.T.S. (18 B.W.G.) needle, mostly from superficial layers of skin.

Sometimes syringing failed to dislodge the skin fragments from the needle. Often they were caught on a small snag and could be seen lying at the needle mouth. Less frequently they were firmly stuck in the lumen and considerable force was needed to dislodge them.

We have tested all needles in the range commonly used for intravenous injections—from the standard needle (18 B.W.G.) included in the Blood Transfusion Service giving-set to a no. 16 hypodermic needle (24 B.W.G.). In most instances ten needles of each size were examined, five being new and five resharpened by the hospital syringe service. Only new no. 14 and 16 hypodermic needles were examined as these are not usually resharpened.

Results

Each needle was tested five times, and a typical example of the results obtained with one size of needle is shown in table I. It will be noted that some needles removed fragments of skin at each thrust, others only sporadically, while rarely no skin at all was obtained. Needles which consistently removed a fragment of skin showed no falling off in performance up to twenty punctures, and in the case of those which only occasionally cut out a fragment, it seemed to be a matter of chance whether this occurred at the first or subsequent attempts.

TABLE I—RESULTS OF TESTING 5 RESHARPENED B.T.S. (18 B.W.G.) NEEDLES

Needle no.	Stab no.					Total no. of fragments
	1	2	3	4	5	
1	+	+	+	+	+	5
2	−	+	−	+	+	3
3	+	+	+	+	+	5
4	−	−	+	−	+	2
5	+	+	−	+	+	4

+ = skin fragment recovered from the needle.

TABLE II—SUMMARISED RESULTS OF TESTS WITH NEEDLES OF DIFFERENT BORE

Size of needle	No. of needles tested	Total no. of stabs	No. of skin fragments
B.T.S. (18 B.W.G.) ..	10	50	37
Serum 1 (19 B.W.G.) ..	10	50	31
Serum 11 (20 B.W.G.) ..	10	50	34
Hypo. 1 (21 B.W.G.) ..	10	50	28
Hypo. 2 (22 B.W.G.) ..	10	50	44
Hypo. 14 (23 B.W.G.) ..	5	25	19
Hypo. 16 (24 B.W.G.) ..	5	25	14

Total no. of skin fragments: 207/300 (69%).

The results of the tests for all needles are summarised in table II. No real difference was noted between new and resharpened needles, and these have not been tabulated separately. Although the incidence with different sizes of needle showed no wide variations, the size of the skin fragment was proportional to the size of the lumen.

Avoiding Removal of Skin Fragments

The needle points were studied microscopically in an attempt to correlate the sharpness of various parts of the bevels with the ease with which fragments were cored out. This study was hampered by lack of an accurate measure of "sharpness", but it was our impression that those which consistently excised skin had either a very sharp or a very ragged back bevel (fig. 2). The needle point as it passes through the skin incises a small semi-circular flap; it is the back bevel cutting across this which transforms it into a free fragment. The back bevels of a selection of needles were therefore blunted and smoothed, but we were disappointed to find that this did not greatly reduce the number of fragments excised. The metal is thin,

Fig. 2—Hollow-ended needle showing "back bevel".
When this was very sharp or ragged, the incidence of skin fragments tended to be highest; but attempts made to blunt the bevel did not reliably avert the excision of fragments.

and it is difficult to produce a really blunt edge and in attempting to do so the bevel may be reversed; this tends to drive the skin into the lumen, where it may become impacted and detached. We found no method of sharpening an open-ended needle which would reliably avoid the excision of skin fragments.

Experiments showed that needles with a closed end do not remove skin fragments. Such needles are of two types: those with a fitted stilette and those with a side opening, such as that described by Mitchell (1952). When a stilette is used it must fit accurately or a fragment of skin may be trapped between it and the needle.

Possible Harmful Effects

Some of the fragments will remain in the needle, some will be sucked into the syringe; and the remainder will be ejected with the injection fluid. The possible harmful effects are considered under these headings.

Fragments remaining in the needle.—If the fragment completely blocks the needle, considerable force may be required to dislodge it and this may cause initial "sticking" of a syringe. A partial block may explain the failure of a transfusion to run freely when a large needle has been successfully placed in a large patent vein. It has also been suggested as an explanation of the occasional failure to withdraw blood from apparently suitable veins at blood-donor sessions (R. L. McAndrew, personal communication).

Fragments aspirated into the syringe.—These may become lodged in the barrel and cause the piston to stick. Alternatively they may remain in suspension and be injected with the fluid.

Ejected fragments.—The fate of these is of particular interest; they are in effect small skin grafts, and there seems no reason why they should not survive and grow provided they come into apposition with a suitable bed.

In the case of subcutaneous and intramuscular injections, the skin fragments will be surrounded initially by the injection fluid and later perhaps by blood-clot. Both of these are inimical to the "take" of a graft, and it is unlikely that many fragments survive. The possibility remains, however, that inclusion dermoid cysts may follow subcutaneous injections, and since this investigation began our attention has been drawn to two such cases. We have been able to produce dermoid cysts in a rat by subcutaneous injection of small fragments of skin.

Following intravenous injection the skin embolus will become impacted in one of the small arterioles or capillaries in the lung (fig. 3). At first it was tempting to correlate the great increase in intravenous injections, and presumably in epithelial emboli in the lungs, during the past twenty years with the increased incidence of lung cancer in the same period. But neither the site of the pulmonary neoplasms nor their histological appearances suggest any connection; nor is there any evidence of an increased incidence of dermoid cysts in the lung. As with blood-borne emboli of malignant tumours it would seem that the great majority, if not all, of the skin fragments fail to survive and are absorbed. Before a skin graft can take, the cut dermal surface must be in intimate contact with a raw vascular bed from which new capillary buds can invade and revascularise the skin. If the endothelium of the arteriole remains intact, survival is impossible. Furthermore, blood-clot will form in the vessel around the graft and also prevent regeneration. It must be assumed, therefore, that all such emboli are walled off by thrombus, invaded by phagocytes, and absorbed.

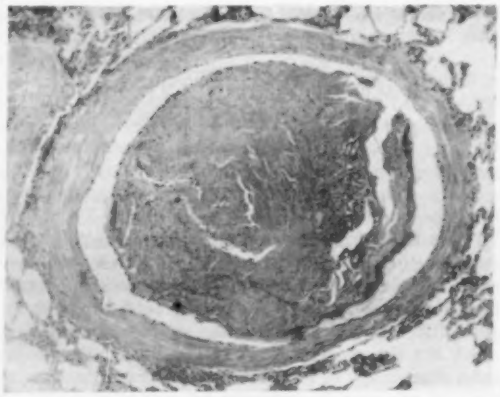

Fig 3—Fragment of rabbit skin impacted in pulmonary vessel two hours after injection.

Surrounded by an intact layer of endothelium, it is most unlikely to survive as a free graft.

The further possibility remains that infection may be introduced into the tissues and the lungs in this way. Skin preparation before injection is often perfunctory; and Crawford (1955), who found skin fragments in needles used for artificial-pneumothorax induction, was able to culture *Staphylococcus aureus* from them unless special skin sterilisation was undertaken. Subcutaneous and intramuscular abscesses after injection are by no means uncommon, and this seems a possible cause. It is also possible that small lung abscesses may similarly result from intravenous injection, although we have no evidence that this is so.

Discussion

Magath and McClellan (1950) found that needles thrust through the rubber diaphragms which cover certain drug bottles frequently remove a core of rubber. Crawford (1955) drew attention to the detachment of skin fragments by the large-bore (18 gauge) needles used in the induction of artificial pneumothorax. Needle biopsy with specially adapted wide-bore needles has proved a reliable method of obtaining tissue from various organs. The present investigation demonstrates that all sizes of needles, provided they have an end-opening, are liable to excise fragments while traversing the skin.

It is difficult to assess the clinical implications of this finding. Many thousands of injections have been given every day for many years, and the fact that no harmful effects have been previously attributed to skin emboli suggests that little is to be feared from that source. With more widespread awareness, however, the very high incidence of detached portions of skin may be correlated with pathological processes. The risk of infection, subcutaneous, intramuscular, or pulmonary, seems to be real and calls for care in skin preparation before injection.

At present there is no reason to condemn the routine use of open-ended injection needles. If for any reason it is desirable to avoid the risk of skin emboli, the trocar-pointed, side-opening needle described by Crawford (1955) would be the simplest to use and the most reliable.

Summary

When a needle is thrust through skin it commonly cores out a fragment of tissue.

In a series of 300 tests with a wide range of needles the overall frequency was 69%.

There is no great variation in the frequency with different sizes of needles, but the skin fragment is roughly proportional to the size of the lumen.

Side-opening needles and those with a fitted stilette do not remove skin fragments.

We are very grateful to Prof. J. P. Todd and Mr. George Reid, of the Glasgow Royal College of Science and Technology, for much helpful advice and technical assistance. We are also greatly indebted to Prof. T. Symington for his help with the animal experiments. Mr. Robert McGregor and Mr. Donald Hay were responsible for the photographs.

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VASCULAR DISEASE IN A DIABETIC CLINIC

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As the treatment of diabetes mellitus improves, so the prevalence of vascular disease increases; and now it has become the most important problem in the management of diabetes. To estimate how frequently clinical vascular disease occurs, a survey was made of patients who had attended the diabetic department of the Royal Free and Hampstead General Hospitals during 1955, 1956, and 1957 either as outpatients or inpatients. A few patients were also referred to the Royal Free diabetic clinic from an Ophthalmic Hospital.

Material and Methods

The criteria for acceptance in this study were that the patient should have proven diabetes, have had a full clinical history and examination, blood-pressure estimations, height and weight recording, chest X-ray, serum-cholesterol estimation, and at least one recent electrocardiogram. At each visit the urine was tested for glucose and protein. 654 patients, representing 75% of those who attended over the three-year period, fulfilled these requirements and were included in this study.

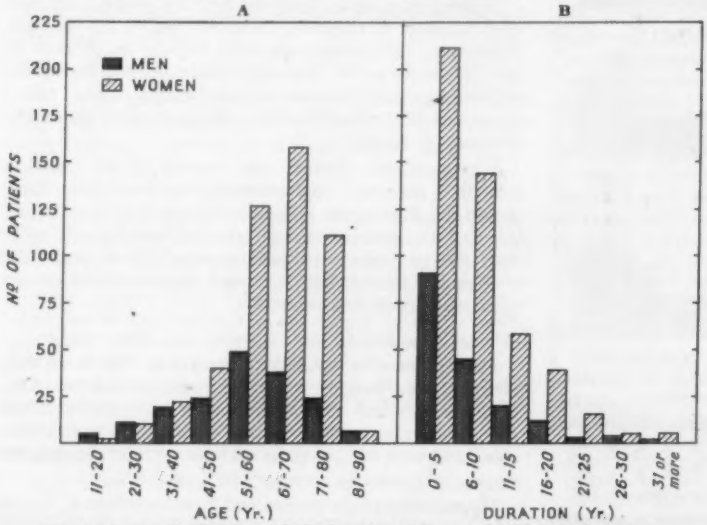

Fig. 1—A, age-distribution and, B, duration of disease, in 654 diabetic patients.

TABLE I—INCIDENCE OF CLINICAL VASCULAR DISEASE IN 654 DIABETICS

	Men	Women	Total	Proportion (%) of all patients
All forms	81	198	279	42·5
Retinopathy	33	102	135	21·7
Nephropathy	16	11	27	4·1
Peripheral vascular disease	33	81	114	17
Intermittent claudication	14	29	43	6·6
Gangrene	3	9	12	1·8
Atherosclerotic heart-disease	39	87	126	19·3
Angina	26	50	76	11·6
Infarct	21	30	51	7·8
Aortic atheroma	9	24	33	5

Two aspects were considered in the assessment of vascular disease in diabetics: (1) the specific vascular abnormalities of diabetes, such as retinopathy and nephropathy; and (2) the complications due to atherosclerosis such as atherosclerotic heart-disease and peripheral vascular disease. These vascular complications were regarded as evidence of clinical vascular disease. The incidence of hypertension, obesity, and hypercholesterolæmia and their relation to clinical vascular disease and electrocardiographic abnormalities were studied. We have not included cerebrovascular disease, which was present in 4% of patients and was almost invariably associated with vascular disease elsewhere.

Composition of Series

The number of women in the survey was 477 (73%) and of men 177. 45% of all patients were treated by diet alone. Age-distribution is shown in fig. 1A; 90% of the patients were over 40 years of age. The proportion of women in this series was higher than that reported in other diabetic clinics dealing with white people (Wilder et al. 1940, Munro et al. 1949, Joslin et al. 1952); and this was no doubt due largely to the preponderance of women attending the Royal Free Hospital. The duration of diabetes and the number of patients in each group is shown in fig. 1B. 90% of patients with diabetes of 0–5 years' duration were over 40 years of age.

Clinical Vascular Disease

Clinical vascular disease was diagnosed when one or more of the following complications was present:

1. Diabetic retinopathy, confirmed by an ophthalmologist.

2. Nephropathy, indicated by persistant proteinuria in the absence of urinary infection. This was usually associated with retinopathy, hypertension, and œdema. Clinically, this was a mixed group, and consisted of those with intercapillary glomerular sclerosis (Kimmelstiel-Wilson kidney) and those with pyelonephiritis and nephrosclerosis of hypertensive origin.

3. Atherosclerotic heart-disease, which was diagnosed when one or more of the following were present: angina pectoris; cardiac infarction (on clinical and/or electrocardiographic evidence); or a loud basal systolic murmur in the absence of hypertension, which we considered suggestive of aortic or aortic valve atheroma.

4. Peripheral vascular disease, which was diagnosed when any of the following were present: intermittent claudication; ischæmic rest pain; or absent arterial pulsation with pallor and coldness of the lower limbs.

Findings

Incidence of Clinical Vascular Disease

The incidence of clinical vascular disease and the frequency of individual complications are shown in table I. 279 patients (42·5%) of the 654 had evidence of clinical vascular disease. As more than one vascular complication was present in many patients, the total of individual com-

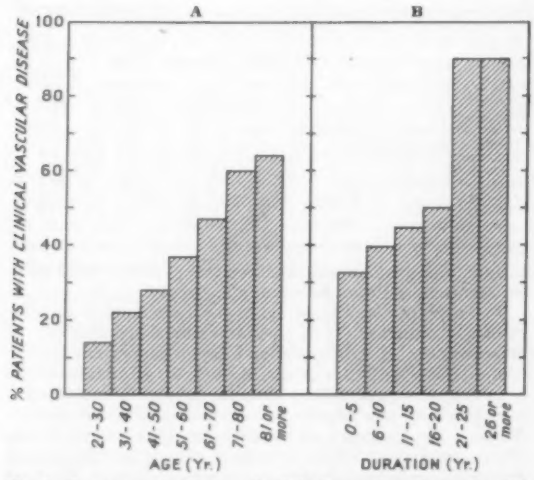

Fig. 2—Percentage incidence of clinical vascular disease in 654 patients related to, A, age of patients and, B, duration of diabetes.

plications was greater than the number of patients with vascular disease.

Nephropathy was found in 4·1% of the series. This figure is unlikely to be an underestimate as each patient was tested for proteinuria at every visit. The total incidence of proteinuria of non-infective origin, including cases with heart-failure and hypertension, was 7·2%.

A third of all patients with angina had electrocardiographic evidence of old or recent infarction. Cardiac infarction, based on history and clinical examination, supplemented by electrocardiography, was found in 40 patients (6%). With routine electrocardiography a further 11 patients had evidence of symptomless infarction, making a total of 51 (7·8%).

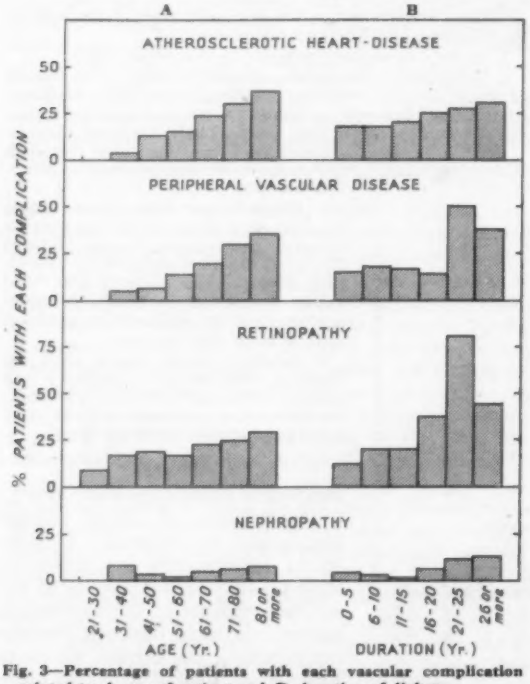

Fig. 3—Percentage of patients with each vascular complication related to, A, age of patient and, B, duration of diabetes.

Clinical Vascular Disease related to Age and Duration of Diabetes

Figs. 2A and 3A show the incidence of vascular disease in different age-groups. The results are presented as percentages of the total number of patients in each age-group.

Figs. 2B and 3B show that clinical vascular disease increased with the duration of the diabetes. The high figure in the 0–5-year-duration group reflects those with diabetes of late onset who have associated vascular disease; moreover in those over 40 the clinical onset is not always an accurate guide to the duration of the disease.

Retinopathy increased steadily with duration of diabetes, attaining a maximum of 80% in the 21–25-year-duration group. In the 0–5-duration group 13% had retinopathy (in this group only 3% of patients under 40 years of age had this complication compared with 17% of those over 60). The high figure of 13% may be due to the difficulty in dating the onset of diabetes by symptoms alone; indeed, patients not infrequently presented with visual deterioration due to retinopathy as their main complaint.

TABLE II—PROPORTION OF HYPERTENSIVES IN EACH AGE-GROUP (BY DECADES) OF SERIES OF DIABETICS

Decade	Hypertensives (%)	
	Women	Men
4th	9	16
5th	37	12
6th	50	43
7th	65	47
8th	70	50
9th	86	70

Retinopathy also increased with age; the percentage for the third decade was 9·5%, and this rose to 29% in those over 80. Correlating age with duration, the incidence of retinopathy was highest in patients aged 41–60 who had had diabetes more than 21 years. The sex-distribution was almost equal.

Nephropathy, apart from the first few years, increased with duration of diabetes. The relation to age was not impressive; the proportions were highest in patients in their 30's and over 60. It occurred most often in those over 60 who had had diabetes for the longest period. Men comprised 50% of those with nephropathy, yet only 27% of the whole series.

Atherosclerotic disease was present at all duration periods of diabetes. Age was more important than duration of the disease; the highest incidence of atherosclerosis was found in patients over 60 who had had diabetes more than twenty years. In patients aged 10–40 years the incidence of atherosclerosis, even in those with the longest duration, was no more than 5%.

Clinical Vascular Disease, Obesity, and Hypertension

Patients were considered overweight if 10% more than their expected weight for their sex, age, and height. 53% of the women and 49% of the men were overweight. Of the women with clinical vascular disease 58% were obese, compared with 49% of those with no vascular disease; the respective figures for men were 50% and 46%.

Hypertension was considered present when a blood-pressure of over 160/95 mm. Hg was repeatedly recorded.

The incidence of hypertension was 36% for men and 56% for women. The proportion of hypertensives in each age-group of the series is shown in table II.

Hypertension was, therefore, commoner in women than men, the incidence increasing with advancing decades. Over 60 years of age 70% of the women and 50% of the men were hypertensive.

Of obese patients hypertension was present in 43% of men and 61% of women, compared with 28% and 42% respectively for those of normal weight.

56% of hypertensive women and 60% of hypertensive men had clinical vascular disease. In normotensives clinical vascular disease was less common—23% in men and 38% in women.

Cholesterol Levels and Clinical Vascular Disease

There were 85 men with a raised cholesterol level (over 200 mg. per 100 ml.), of whom 34 (40%) had clinical vascular disease. 92 men had normal serum-cholesterol levels, and 46 (50%) of these had clinical vascular disease. The figures for women were 254 with raised cholesterol, of whom 109 (40%) had clinical vascular disease, and 223 with normal values of whom 90 (40%) had vascular disease. Patients with diabetic nephropathy had raised blood-cholesterol levels but their numbers have not influenced the general conclusions. The cholesterol levels were also related to abnormal electrocardiograms, but again there was no positive relationship. The serum-cholesterol level was not significantly higher in the patients with atherosclerotic heart-disease than in the remainder, nor did it differ in patients with clinical vascular disease as compared to those without.

Routine Electrocardiography

The total number of patients with an abnormal electrocardiogram was 280 (42·5%). Those with clinical vascular disease and/or an abnormal electrocardiogram constituted 59·5% of the series. When patients with hypertension were included the figure rose to 73%. The incidence of electrocardiographic abnormalities in patients with clinical vascular disease was 61%, compared with 30% in those without electrocardiographic changes. The routine use of the electrocardiogram showed that subclinical infarction occurred sufficiently often to warrant its use in all diabetics over 40 years of age.

Deaths

37 of the patients in this series died during the three-year period under study. 28 (76%) of these patients died from cardiorenal causes; 11 of them had nephropathy.

Discussion

The incidence of clinical vascular disease in this study was substantially the same as that reported in other series. Bryfogle and Bradley (1957), using similar diagnostic criteria, found 49·5% clinical vascular disease in 394 inpatients, and Matthews (1954) found 53% in 545 diabetics. In general, vascular disease is related to age, and this is due largely to the increasing prevalance of atherosclerosis in the older age-groups. The specific diabetic angiopathies increased with duration of diabetes; and this was also the experience of Dolger (1947), Lundbaek (1954), Matthews (1954), and Bryfogle and Bradley (1957).

Retinopathy

Retinopathy was found in 21·7% (table I) and an identical figure was obtained by Matthews (1954) in a similar type of clinic. Other series have shown higher figures—Wagener (1945) 30·6%, Kornerup (1955) 46·8%, Bryfogle and Bradley (1957) 35·8%. These series included a higher proportion of younger diabetics. The incidence of retinopathy in younger patients with diabetes of long duration may be as high as 70–80% (Lundbaek 1954).

Nephropathy

Bryfogle and Bradley (1957) found this complication in 10% of their diabetic inpatients, and other series give figures as high as 25% of diabetics (Wilson et al. 1951, Bell 1953); but these studies were either on young patients with diabetes of long duration or on inpatients. In our series nephropathy was uncommon (4·1%)—comparable with low figure reported by Freedman et al. (1958). The prognosis of nephropathy is such that there were few patients with this disorder in the clinic at any given time. Routine testing of urine has shown, however, that the interval between onset of proteinuria without symptoms and death can be as long as eight years.

Atherosclerotic Heart-disease

It is difficult to compare atherosclerotic disease in one series, with another, because criteria for diagnosis vary and interpretation may differ between observers, as may the sample for age, sex, and duration. We have not included as evidence of atherosclerotic heart-disease non-hypertensive cardiomegaly, arterial calcification, or non-specific abnormalities in the electrocardiogram.

19·3% of our patients had atherosclerotic heart-disease, but Liebow et al. (1955) and Bryfogle and Bradley (1957) found totals of 42% and 56·3% respectively, using wider criteria of diagnosis. If those patients with angina and infarction only are considered (17% over 40 years of age in this group) then all three studies show similar findings. The proportion of patients with angina pectoris in this study was 11·6%. This compares with 9·1% found by Bryfogle and Bradley (1957) and 10·2% by Liebow et al. (1955).

Atherosclerotic heart-disease occurs more commonly in diabetics than in the general population. Brown et al. (1957) reported an incidence of 8·4% in a general practice survey of men in the seventh decade. In the present series for the same sex and decade 34% had atherosclerotic heart-disease. In non-diabetic subjects Oliver and Boyd (1955) found that the male: female ratio of coronary-artery disease under the age of 50 was 7 : 1. In this series the incidence of atherosclerotic heart-disease, using slightly different criteria, was 1 : 1 under 50 years of age but over this age men predominated by 1·6 : 1·0.

The cholesterol levels were not significantly raised in patients with atherosclerotic heart-disease, which is in agreement with Liebow et al. (1955). This is surprising in view of the generally accepted findings that the serum-cholesterol level is raised in coronary-artery disease both in the general population (Gertler et al. 1950, Oliver and Boyd 1953), and in diabetics (Barach and Lowy 1952).

Peripheral Vascular Disease

Oakley et al. (1956), in a large series, reported an overall figure of 3·5% rising to 10% in those over 70. Bryfogle and Bradley (1957), using similar criteria, found an incidence of 15·7%. In the present study peripheral vascular disease was diagnosed in 17% of patients. Intermittent claudication occurred more commonly than gangrene, although this was not the experience of Semple (1953).

Hypertension

Hamilton et al. (1954) and Bøe et al. (1957) have stressed the difficulty of defining hypertension but have shown in the general population that blood-pressure increases with age. This trend is particularly apparent in diabetics. We found no correlation with duration of diabetes. In patients over 60 years of age 70% of the women and 50% of the men were hypertensive, and these figures are comparable with those of John (1932) and Boas (1952).

The incidence of hypertension was increased in those with

obesity, but not notably. Liebow et al. (1955) in diabetics and Bøe et al. (1957) in a general population survey found similar relationships.

In the present series hypertensives had significantly more clinical vascular disease and electrocardiographic abnormalities than non-hypertensives. This may in part be due to the fact that those with hypertension were in the older age-groups.

Summary

654 diabetics were investigated to determine the incidence of vascular disease and its relationship to age and duration of diabetes, obesity, hypertension, cholesterol levels, and electrocardiographic abnormality.

90% of the patients were over 40 years of age and 73% were female.

42·5% had clinical vascular disease; 59·5% had clinical vascular disease or electrocardiographic abnormalities; including hypertensive patients among those with vascular disease, only 179 (27%) had a "normal" vascular system.

The incidence of atherosclerotic heart-disease was 19·3% (angina pectoris 11·6% and myocardial infarction 7·8%), of peripheral vascular disease 17%, of retinopathy 21·7%, of nephropathy 4·1%, and of hypertension 36% in men and 56% in women. The majority of patients with vascular disease had more than one complication.

Clinical vascular disease was twice as common in hypertensives as in normotensives. Electrocardiographic abnormalities were twice as common in patients with clinical vascular disease as in those without.

No relationship was found between clinical vascular disease and cholesterol level.

Obesity was slightly more common in patients with clinical vascular disease than in others.

Atherosclerotic disease and specific diabetic angiopathy were common in patients over 40 years of age at their first attendance.

We wish to thank Dr. Una Ledingham for permission to study her patients and for her encouragement; Dr. Frances Gardner, who has reported on the majority of the electrocardiograms; Dr. A. G. Beckett, whose clinical records were of great help in enabling us to complete the study; and Dr. John Knowelden, of the M.R.C. Statistical Research Unit, for criticism.

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TREATMENT OF THE NEPHROTIC SYNDROME WITH CONCENTRATED HUMAN ALBUMIN

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IN the treatment of the nephrotic syndrome the use of plasma-expanders such as concentrated human albumin, dextran, or triple-strength plasma has on the whole been disappointing. Although they induce diuresis they do not affect the underlying lesion, and their benefit is usually temporary, as in the case reported by Edwards (1957) in which the œdema recurred a week after leaving hospital. The main indication for them is in cases which do not respond to steroid therapy and which show increasing œdema despite routine measures. In such a case, reported here, concentrated human albumin proved of great value. This case was also of interest because the nephrosis may have been due to an allergic reaction following inoculation with T.A.B.T. (a phenolised vaccine containing *Salmonella typhi*, *S. paratyphi* A and B, and tetanus toxoid).

Case-report

On June 26, 1957, a 19-year-old private was admitted to hospital in Germany with swelling of the ankles which had started 3 days previously—10 days after a routine T.A.B.T. inoculation. There was no history of recent sore throat or past renal disease. He had previously been given T.A.B.T. in September and November, 1956.

He had gross pitting œdema of the legs and genitalia, dullness and diminished air entry at the base of the right lung, and a blood-pressure of 140/110 mm. Hg. Hæmoglobin 112%; white blood-cells 5200 per c.mm. (differential count normal); erythrocyte-sedimentation rate (Wintrobe) 21 mm. in 1 hour; blood-urea 54 mg. per 100 ml.; serum-cholesterol 418 mg. per 100 ml.; serum-proteins 5·84 g. per 100 ml. (albumin 2·7 g., globulin 3·14 g.). The urine contained many granular casts, some leucocytes, and very occasional red cells. There was heavy albuminuria, ranging from 15 to 20 g. in 24 hours. Radiography showed a small right pleural effusion.

Course of Illness

He was put on a high-protein low-salt diet and 2 days later started on cortisone acetate by mouth (200 mg. daily). This was continued in reduced dosage until July 20 but without appreciable effect on urine output or albuminuria. During this time his weight increased by a stone and his blood-pressure rose to 190/130 mm. Hg. He was then invalided home and admitted first to Tidworth Military Hospital (where he was given prednisone 40 mg. daily) and on Aug. 8 to Queen Alexandra Military Hospital. By this time he was grossly œdematous, with bilateral pleural effusions and ascites: his weight had increased by over three stone. Running transversely across the fingernails were paired white bands, separated from each other and from the lunula by areas of normal pink nail. The hypertension persisted (140/100). The fundi were normal.

The blood-urea was now 92 mg. and the serum-cholesterol 740 mg. Serum-proteins were 4·2 g. per 100 ml. (albumin 1·4 g., globulin 2·8 g.), the electrophoretic strip showing a very high α_2 peak. Electrophoresis of the urine showed a large albumin peak with a small β-globulin peak, the albumin/globulin ratio being 7·3 : 1. The serum-electrolytes were: sodium 143, potassium 5, chlorides 98, and alkali reserve 24·0 mEq. per litre. The urinary electrolytes were: sodium 14·5, potassium 46·5, and chloride 25·5 mEq. per litre.

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Renal biopsy was done on Sept. 12. Dr. S. J. De Navasquez, reporting on four glomeruli and associated tubules, found the former substantially normal except for some haziness of the basement membrane. The associated tubules show severe albuminoid degeneration. The picture is that of predominately tubular disease, and glomerulonephritis can probably be excluded (fig. 1).

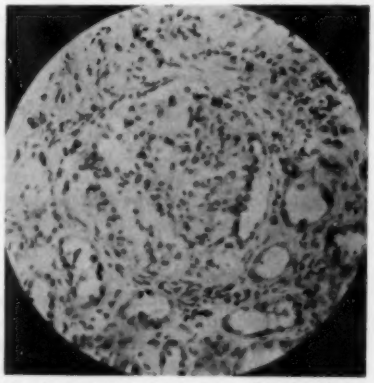

Fig. 1—Renal biopsy showing albuminoid degeneration of tubules and relatively normal glomerulus (hæmatoxylin and eosin).

The patient continued to deteriorate and on Aug. 11 developed extensive cellulitis of the left leg. His temperature was 101°F, his white-cell count 20,000 per c.mm. (polymorphs 63%, myelocytes 24%, lymphocytes 7%, stab cells 6%), and his hæmoglobin 55%. Though the infection responded to penicillin, he remained desperately ill.

Treatment with Albumin

On Aug. 13 an intravenous infusion of 75 g. of human albumin (prepared by the Lister Institute), dissolved in 450 ml. of distilled water, was given slowly over 4½ hours. During the next 24 hours his output of urine increased and his condition improved. As a similar infusion next day produced further improvement it was decided to continue infusions with these every 3 or 4 days. In addition he received a high-protein low-salt diet supplemented by 'Casilan' (about 250 g. of protein daily) and his fluid intake was restricted to 600 ml. by mouth daily. The prednisone was stopped on Aug. 16.

His further progress can be seen from fig. 2. For 3 weeks his urine output was maintained at 1–2 litres a day and there was a steady fall in weight. At the beginning of September, after the seventh infusion, a much larger diuresis occurred which continued for two weeks: œdema disappeared and his weight fell by over three stone. At the height of the diuresis he was passing up to 100 g. of protein daily and the urinary sodium concentration rose to 114 mEq. per litre (potassium 18·8, chlorides 83). The serum-albumin level, which had risen from 1·4 to 1·8 mg. per 100 ml. after the first infusion, subsequently fluctuated around 2 mg. and only rose further after the diuresis was complete. With the rise in serum-albumin there was a corresponding reduction in α_2 and β globulins and a gradual fall in the serum-cholesterol. The blood-urea continued to rise during the first two weeks of treatment, reaching a maximum of 176 mg. per 100 ml. on Aug. 20, but dropped sharply to 36 mg. 2 days before the main diuresis. Another encouraging sign at this stage was the fall in the blood-pressure to normal levels at the beginning of the diuresis.

The albumin infusions were continued until Oct. 3, a total of 1200 g. being given. Although, after the infusions were stopped, the serum-albumin dropped from 4·5 g. per 100 m to 3·5 g. it later rose again and there was no recurrence of œdema. At this stage the amount of albumin in the urine began to decrease and the patient was discharged from hospital on Nov. 20, looking extremely well, with a serum-albumin level of 4·5 g. per 100 ml.

Follow-up

In October, 1958, 15 months after the onset, there were no abnormal findings on examination. Blood-pressure 110/80; serum-cholesterol 250 mg.; serum-proteins 7·3 g. (albumin 4·5 g., globulin 2·8), with a normal electrophoretic pattern. Slight albuminuria (60 mg. per 100 ml.) continued.

Discussion

Albumin forms only 60% of the total plasma-protein but accounts for about 80% of their osmotic activity. The hypoalbuminæmia which is a constant feature of the nephrotic syndrome reduces the colloid osmotic pressure and thus decreases the plasma volume by 20–30% (Squire 1953). This decrease in plasma volume is thought to be the trigger mechanism which increases secreotin of aldosterone with consequent retention of sodium and water by the kidney (Bartter 1957). An infusion of albumin which raises the colloid osmotic

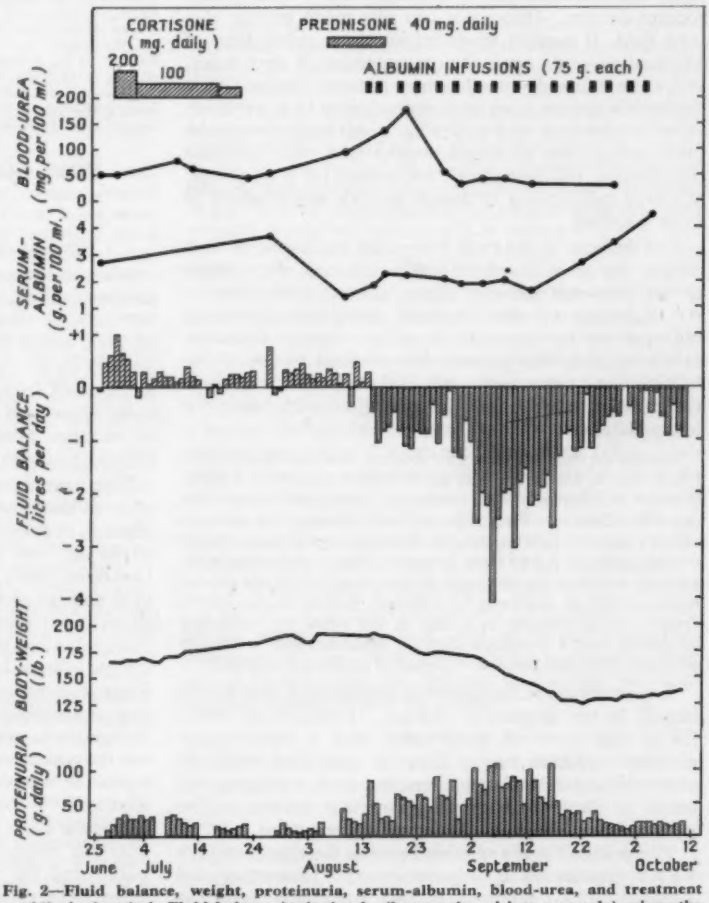

Fig. 2—Fluid balance, weight, proteinuria, serum-albumin, blood-urea, and treatment while in hospital. Fluid balance is the intake (by mouth and intravenously) minus the urine output.

pressure will cause an increase in plasma-volume which in turn inhibits the secretion of aldosterone and so promotes a diuresis. But the increase in plasma-volume may mask a rise in total circulating albumin. This explains why a diuresis can occur without much rise in the serum-albumin level, as happened in our case where the first infusion was followed by a steady diuresis but by only a slight increase in the serum-albumin which in fact dropped again with the onset of the critical diuresis. After each infusion the proteinuria increased—presumably through a rise in the glomerular filtration-rate and the serum-albumin level. When the diuresis was complete, the albuminuria decreased rapidly and there was a sharp rise in the serum-albumin.

It has been suggested that the hypoalbuminæmia of the nephrotic syndrome is due not only to the loss of albumin in the urine but also to increased metabolic breakdown. Gitlin et al. (1956), studying six children, found that severe hypalbuminæmia was the result of increased catabolism and of albuminuria, occurring simultaneously. In our case, when the turnover of albumin labelled with ^{131}I was studied towards the end of the diuretic phase, the rate of breakdown appeared to be normal.

Concentrated human albumin, which is prepared by ether fractionation, has a relatively low viscosity and sodium content. Hence one can give much protein in a little fluid. If massive single infusions are given, signs of overloading—e.g., headache, engorgement of neck veins, and a rise in blood-pressure—may appear. Martin (1954) found that in most cases rates equivalent to 15 g. per hour, up to a total dose of 1 g. per kg. body-weight, could be given safely; but he recommended that, with repeated transfusions, the dose should not exceed 150 g. per week. We used this scheme of dosage without any systemic or local reactions.

The findings in the renal biopsy are interesting in that, despite the gross anarsarca and proteinuria, the changes in the glomeruli are very slight. In particular there is no thickening of the basement membrane, which is regarded as the classical lesion of type-II nephritis. However, since the introduction of renal biopsy it has become clear that in early cases of the nephrotic syndrome the histological changes in the glomerulus may be inconspicuous.

Among the thirteen cases they studied, Ross and Ross (1957) found five in which the only glomerular lesions were a small increase in cellularity with occasional bland focal lesions and capsular adhesions. They regarded these changes " as evidence of early type-II nephritis because these patients in their clinical course, so far as it had been followed, closely resembled other patients in whom the diagnosis of type-II nephritis was proved subsequently at necropsy ", although Joekes et al. (1958) found similar changes in a case of the nephrotic syndrome associated with a Schönlein-Henoch syndrome and in another in which there was possible evidence of an allergic reaction.

The prognosis of the nephrotic syndrome is determined largely by the glomerular changes. Joekes et al. (1958) found that none of their cases with a membranous glomerulonephritis had a complete remission with loss of proteinuria as well as œdema, but such remissions did occur in those with slight glomerular lesions. The prognosis for our patient therefore appears good.

The possibility of a relation between the illness and the T.A.B.T. inoculation is of great interest. Robertson and Leonard (1956) reported various conditions occurring 7–10 days after an inoculation with T.A.B.T., including arthropathies, purpuric skin eruptions, and other immune allergic phenomena. They postulated that all the immunological processes were disturbed at this time. Knox and Stamm (1957), in a survey of 55,459 recruits, found that the incidence of disease was lower in the inoculated group than in the controls, although they point out that this does not exclude the possibility of individual rare syndromes being caused by T.A.B.T. inoculation. No case of the nephrotic syndrome has previously been reported, and the association may be fortuitous.

Summary

A case of the nephrotic syndrome, occurring 10 days after immunisation against typhoid and tetanus, is described. There was no response to either cortisone or prednisone; but concentrated human albumin, given intravenously, produced an excellent diuresis, which has been followed by a long clinical remission.

We should like to thank the Lister Institute for their generous gift of human albumin; Dr. S. J. De Navasquez for the histological report on the renal biopsy; and Mr. D. E. Tomkinson, of the Royal Army Medical College, for the photomicrograph.

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POST-SCHISTOSOMAL UROPATHY

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SCHISTOSOMIASIS is not endemic in Kuwait, though people occasionally become infected here. (Of more than 200 patients seen in six years only 7 had never lived in an area where the disease is endemic.) It is therefore possible to get an impression of the course of the disease as modified by treatment but uncomplicated by reinfection. Moreover, when dealing with company employees, an excellent filing system and adequate records make it relatively easy to trace patients for follow-up.

The treatment of *Schistosoma hæmatobium* infection with antimony or ' Miracil D ' is not very satisfactory. Though in many patients the worms are killed or rendered sterile and ova are no longer passed in the urine after treatment, often the deposited ova have already inflicted such damage on the urinary tract that it has become liable to recurrent pyogenic infection. This may cause symptoms—dysuria, urgency, frequency, or hæmaturia—which are indistinguishable from those of the original disease. Recurrent urinary-tract infection, following the destruction or sterilisation of ova-producing schistosomes, must be familiar to many of those who have to treat bilharziasis, but the condition receives scant attention in standard textbooks or current literature. Sayegh (1950) gave an admirable account of the final picture, as seen in a urological clinic; and Greig (1940) described a probable example, recognising the true nature of the process but publishing his paper under the title Case of Urinary Bilharziasis showing marked Anæmia and Resistance to Antimony Treatment. There is a vast literature on the

complications and sequelæ of bilharzial infection; but almost all writers either deal with a phase of the disease when the worms are still alive, or do not specifically say whether the worms were alive or dead.

A patient who has been treated for urinary schistosomiasis is considered cured when the centrifuged deposit from nine specimens of urine—three taken at the end of three weeks, three at the end of six weeks, and three at the end of three months—have all been free from viable ova. Viability is determined from the microscopic appearance and by hatching tests. In each of the cases to be described three additional specimens were examined microscopically, each consisting of the terminal few drops of urine voided immediately after exercise. In none of the patients was it possible to estimate the period of active infection by the schistosome before successful specific antibilharzial therapy.

Illustrative Cases

Case 1.—A man aged 35 first complained of low back pain in 1951. His urine contained pus-cells and red blood-cells. In 1955 he was found to have urinary schistosomiasis and was treated with a standard course of ' Anthiomaline '. He ceased to void ova, and repeated examinations of his urine showed no recurrence; but every specimen examined contained red and white blood-cells. During the past two years he has had six attacks of dysuria with frequency (and on one of these occasions treatment with anthiomaline was started). Each acute exacerbation responded promptly to sodium citrate, either alone or with sulphonamides. During the past year nocturnal frequency has persisted even in remissions.

Excretion and retrograde pyelograms and cystoscopy in 1955 and in 1957 showed no abnormality. The intradermal injection of cercarial antigen (Fairley and Williams 1927) gave a positive reaction in 1957.

Case 2.—A young man with proved urinary schistosomiasis was treated with anthiomaline. The course was completed in August, 1951, since when no ova had been found in the urine. In 1952 he was admitted for investigation of recurrence of his dysuria and frequency. He had red and white blood-cells in his urine, and on cystoscopy several small papillomata above the trigone were cauterised. Treatment with ' Stibophen ' was also started but was discontinued after four doses. His attacks of frequency and dysuria continued, perhaps with diminishing frequency: they responded temporarily to simple urinary antiseptics. Cystoscopy in 1957 showed no lesion and the intradermal sensitivity test to cercarial antigen was negative; but red and white blood-cells have always been found in his urine.

Case 3.—An adolescent male was treated for bilharziasis in July, 1956, with a combination of miracil D and sodium antimony tartrate (Forsyth 1958). Subsequently he had repeated attacks of urinary infection, all responding to sulphonamides and alkalis. Red and white blood-cells in varying numbers have persisted in his urine but no ova have been seen. Excretion pyelography in February, 1957, showed slight unilateral hydronephrosis. Cystoscopy revealed that this was caused by a stricture at the lower end of the left ureter. Cercarial antigen injected intradermally at this time gave a strongly positive reaction.

Case 4.—Urinary schistosomiasis was first diagnosed in a 25-year-old man in 1955. He was treated with a combination of sodium antimony tartrate and miracil D followed by courses of anthiomaline and miracil D alone; but he relapsed after each. " Cure " was achieved after a long course of sodium antimony tartrate; but he continued to have attacks of frequency and dysuria, often with fever. Every specimen of urine in the past year has contained red and white blood-cells but no bilharzial ova. An excretion pyelogram in February, 1957, showed mild bilateral hydroureters with calcification in the lower end of the left ureter. The intradermal cercarial test was negative.

Case 5.—In 1953 a young man with urinary bilharziasis was given an intensive one-day treatment with sodium antimony tartrate (Seitz 1953). During that year he had three recurrences of dysuria and urgency, each time with microscopic hæmaturia and pyuria. These responded to sulphanilamide and alkalis, but nocturnal frequency persisted. In 1954 he had an attack of right-sided renal colic. Cystoscopy showed numerous papillomata on a pale vesical mucosa with fibrosis and obstruction of the right ureteric orifice. Intravenous pyelography revealed hydronephrosis and hydroureter on the right with irregular dilatation of the lower part of the left ureter. He was treated with alkalis, became symptom-free, and took his own discharge. In 1956 he had an attack of fever, frequency, and dysuria, with pain and tenderness in the right loin. There was hæmaturia, pyuria, and bacilluria, all of which responded to chemotherapy. Cystoscopy with retrograde pyelography showed gross fibrosis and distortion around the right ureter so that its orifice could not be seen. Large vascular masses protruded into the lumen of the bladder. Intravenous pyelography showed a non-functioning right kidney with several calculi at the lower end of the ureter. There was irregular dilatation of the lower part of the left ureter. The cercarial skin-sensitivity test was negative.

The stones were removed from the right ureter and he had an uneventful convalescence. Apart from nocturnal frequency (with persisting microscopic hæmaturia and pyuria) he has remained symptom-free for the next two years.

Case 6.—In 1956 a young man received the intensive five-injection treatment with antimony tartrate (Forsyth 1958). Though he ceased to void ova, many examinations of the urine consistently showed white and red blood-cells in the centrifuged deposit. He had occasional attacks of dysuria, sometimes with frank hæmaturia. Intravenous pyelography in early 1956 showed a large hydronephrosis on the right and a non-functioning kidney on the left. On cystoscopy the posterior wall of the bladder was seen to be roughened and extremely vascular. It was not possible to pass ureteric catheters. The cercarial antigen gave a positive intradermal reaction. He was advised to have ureteric transplantation but refused operation. Since then the dysuria and hæmaturia have persisted.

Discussion

Post-schistosomal uropathy is extremely common; the above cases illustrate varying degrees of damage sustained during the active phase of the infection. The syndrome must always be borne in mind when one is dealing with patients who have an apparent relapse after treatment for bilharziasis. It is unnecessary—and possibly dangerous—to give specific antischistosomal treatment, unless viable ova are found in the urine. Skin-sensitivity tests, complement-fixation reactions, and the like are not very helpful in these patients, however valuable they may be in case-finding. Sterile worms, or worms all of one sex, give a positive reaction; but this should not influence treatment so long as no ova are produced.

The doctor's duty is not finished when he has " cured " his patient of urinary bilharziasis. The patient should remain under observation, and if urinary symptoms persist or recur he should undergo full urological investigation to determine the amount of damage sustained. Surgical treatment may be indicated.

Summary

The syndrome of post-schistosomal uropathy is described briefly and illustrated with 6 cases of varying severity.

The condition is common; and—unless corrective surgical measures are possible—the prognosis in severe or advanced cases is poor, even though the schistosome has been eliminated.

Patients who have a recurrence of symptoms after

treatment for bilharziasis should not be given further specific antischistosomal treatment unless viable ova are found in the urine.

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CUSHING'S SYNDROME ASSOCIATED WITH ADENOCARCINOMA OF THE OVARY

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Cushing's syndrome is usually associated with hyperfunction, hyperplasia, or tumour of the adrenal cortex, the excessive secretions of which are responsible for the clinical and metabolic features of the disease. This alteration of adrenal function is often associated with cellular changes and hyperplasia of the basophil cells of the pituitary gland, but a few cases present with neoplasia in sites such as thymus, bronchus, pancreas, or ovary. As increasing numbers of the latter group are described the association seems less likely to be fortuitous, both the adrenal hyperfunction and neoplasia having a common "cause", which Thorne (1952) suggests is an innate abnormality of adrenal cortical metabolism destined in later life to give rise to malignant disease precociously awakened in Cushing's syndrome. The case described here throws no further light on this postulate but provides evidence that the excessively high concentrations of circulating steroid responsible for the clinical syndrome result from oversecretion rather than from failure of inactivation in the liver. This possibility was discussed by Harrison et al. (1957) in whose patient Cushing's syndrome developed in association with carcinoma of the bronchus which had metastasised widely to the liver.

Case-report

A widow, aged 64, was first admitted to King's College Hospital under the care of Dr. A. Gilpin in July, 1954, having complained of abdominal fullness for the previous two months. There was no history of gastrointestinal upset nor of an abnormal menopause or blood-loss since the menopause. In her family one sister had diabetes controlled by diet alone.

Examination

The patient had gross ascites and a hard fixed mass high in the left fornix of the vagina; her external genitalia were normal. Her blood-pressure varied between 190/105 and 170/90 mm. Hg.

Laparotomy

The ascites having been relieved, a laparotomy was performed by Mr. S. G. Clayton on July 14. A right ovarian mass was excised, and deposits of growth were noted in the pouch of Douglas and around the bladder. The omentum and liver seemed to be free from deposits. The excised mass consisted of ovarian tissue; this was the site of a semicystic growth which on section was found to be completely anaplastic except in some areas where there was a poorly differentiated adenocarcinoma.

Treatment and Course

On July 17, three days after the operation, glycosuria was noted for the first time. The blood-sugar level two hours after a glucose meal was 334 mg. per 100 ml. This diabetic condition was first treated unsuccessfully by restricted diet and from July 30 with 16 units of insulin zinc suspension, the dose being increased to 32 units by Aug. 17. At this time other facets of Cushing's syndrome appeared—ankle œdema, purplish petechiæ over both legs, plethoric facies, and hair on the lip and chin. The blood-pressure slowly rose until on Aug. 25 it was 200/120 mm. Hg. She was discharged on the following day on a diet of 130 g. of carbohydrate with 44 units of insulin zinc suspension; the laparotomy wound had healed only slowly. She attended for deep X-ray therapy to the pelvis between Aug. 30 and Sept. 17, receiving a total of 3500r through two fields. She derived little benefit from this and was readmitted to hospital on Oct. 21 complaining of abdominal pain, tiredness, and drowsiness. Her mental condition had changed to one of suspicion and depression. Her heart was enlarged; her blood-pressure had fallen to 160/100 mm. Hg. Her face was bloated, purple, and increasingly hirsute, while other purple areas had developed over the abdomen and thighs. At no time were there definite striæ. Her diabetes was controlled with difficulty on 56 units of insulin zinc suspension. A urinary infection developed, and with increasing cachexia she died in coma on Nov. 10, four months after the first signs of Cushing's syndrome had appeared.

Investigations

17-ketosteroids were measured on a twenty-four-hour specimen of urine by a method similar to that recommended by the Medical Research Council (1951). Adrenocortical steroids were measured by the method of de Courcy et al. (1953); while plasma levels were estimated by the method of Nelson and Samuels (1952).

On Aug. 17 the twenty-four-hour urinary excretion of 17-ketosteroids amounted to 23·0 mg. Urinary adrenocortical steroids were found to be as follows (μg. per twenty-four hours):

Date (1954)	*Cortisone*	*Cortisol*	*Tetrahydrocortisone and tetrahydrocortisol*
Aug. 17	480	1200	13,000
Oct. 23	250	1000	1800
(Normal female range)	(30–110)	(10–120)	(160–4000)

The plasma 17-hydroxycorticosteroids amounted to 74 μg. per 100 ml. on Nov. 5, 1954, and 40 μg. per 100 ml. on Nov. 8 (normal up to 20 μg. per 100 ml.).

Serum-electrolytes were first estimated (E.E.L. flame photometer) on Oct. 22, 1954: sodium 148 mEq., potassium 2·6 mEq., chloride 101 mEq., and bicarbonate 34 mEq. per litre. Blood-urea 27 mg. per 100 ml. Repeat estimations on Nov. 10 revealed significant changes only in potassium, which had risen to 6·1 mEq. per litre, and in blood-urea which had risen to 68 mg. per 100 ml. Postprandial blood-sugar on July 19, 1954, was 334 mg. per 100 ml. At no time was the characteristic polycythæmia, leucocytosis, or eosinopenia found; the hæmoglobin value never rose above 13·0 g. per 100 ml.; white blood-cells 6000 per c.mm. with a normal differential count. Electrocardiography on Oct. 28, 1954, showed changes consistent with hypokalæmia. Radiography showed no evidence of osteoporosis, rib fractures, or secondary deposits.

Postmortem Examination (Dr. B. S. Cardell)

The pelvis was filled with plaques of growth and there were metastases in the abdominal lymph-nodes, liver, spleen, diaphragm, and lung. The left ovary was enlarged and replaced by growth. The adrenals (weight 26 g. together) showed an increase in the thickness of the cortex. The heart showed mild left ventricular hypertrophy. Histological sections of the excised ovarian tumour showed an anaplastic carcinoma with no structural features to suggest that it was an arrhenoblastoma or a masculinovoblastoma (see fig. 1). Sections of the metastatic tumours showed a similar picture. The pituitary contained no adenoma or changes in numbers of the various cell

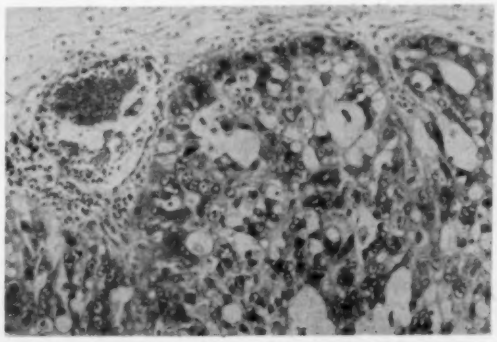

Fig. 1—Section of ovarian adenocarcinoma removed at laparotomy. (Hæmatoxylin and eosin. ×250.)

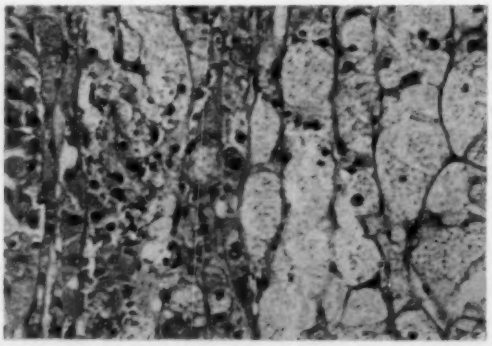

Fig. 2—Section of adrenal cortex showing hypertrophied clear and compact cells which occupied the width of cortex. (Hæmatoxylin and eosin. ×200.)

types. The thymus contained scattered foci of lymphoid tissue only, while the pancreas showed several necrotic areas with no inflammatory reaction—presumably due to autolysis. Two specimens of tumour tissue from the diaphragm were homogenised separately and extracted with ethyl acetate, and the purified extracts were examined by paper chromatography. One portion contained 5 μg. of cortisone and 10 μg. of cortisol. In view of the high level of urinary corticosteroids, it is likely that there was contamination by urine or ascitic fluid during postmortem removal. This view is supported by similar relative values of cortisone and cortisol in tumour and urine analyses. A second specimen was therefore washed with water before homogenisation, and was found to contain only 2 μg. cortisone and 1 μg. cortisol.

Histological sections of the adrenals were examined by Prof. T. Symington, of Glasgow, who found the glands hyperplastic, having a mixture of two types of hypertrophied cortical cells. The first is a clear cell with vacuolated cytoplasm composed of large lipid globules and a small central nucleus, while the second is a compact cell with a distinctive eosinophilic cytoplasm (fig. 2). Groups of both types of cell extend from the medulla to the capsule; no obvious zona glomerulosa is seen. These findings are consistent with those described in the adrenal gland in Cushing's disease at necropsy.

Discussion

Ovarian neoplasia is rarely associated with the full picture of Cushing's syndrome.

Thompson and Eisenhardt (1943) mention 1 case of arrhenoblastoma from a series of 98; while Plotz et al. (1952), reviewing 222 reported cases, excluded the group of 14 ovarian tumours with Cushing's syndrome collected by Kepler et al. (1944) on the grounds that masculinisation dominated the picture and that the majority represented only a partial syndrome. These latter tumours are characteristically yellow on section, unilateral, and of low malignancy and have the histological pattern of adrenal cortical rests. More recently Deaton and Freedman (1957) reported a further case of Cushing's syndrome with hirsutism, characteristic obesity, transient diabetes, and hypertension, associated with a masculinovoblastoma of the left ovary whose excision was followed by regression of the symptoms.

Thorne (1952) has split into two groups the tumours associated with Cushing's syndrome. In the first group, containing the pituitary, adrenal, and ovarian tumours, the relation is causal; whereas in the second, including the thymus, pancreatic, and bronchial neoplasms, the relation is unexplained. The case reported here seems to fall more naturally into the second group in that the tumour is unlike the usual hormone-producing tumours of the ovary (arrhenoblastoma and masculinovoblastoma) in position, malignancy, and histological structure. Moreover the syndrome is almost complete in that virilism is balanced by electrolyte and metabolic derangement. In discussion of the relation between thymic (Hubble 1949, Thorne 1952), bronchial (Harrison et al. 1957), and pancreatic-islet (Rosenberg 1956) tumours and the syndrome it is becoming clear that undifferentiated neoplastic cells in these sites can be associated with excessive secretion of adrenal cortical hormones, giving rise to the complete or a partial picture. Occasionally severe electrolyte disturbances dominate the presentation (Spaulding et al. 1955), demonstrating the possibility of single groups of adrenal hormones being produced in excess. The fact that in these cases the adrenals may not be enlarged or be the site of tumour formation or deposit does not mean that the adrenal is not the site of the increased hormone production; in fact, in several cases of Cushing's syndrome removal of normal adrenal tissues has been followed by regression (Sprague 1953, Bayliss 1957). In a briefly reported case associated with bronchial carcinoma, removal of the adrenals not only caused regression of the hormonal effects but slowed extension of the tumour (Nabarro 1957).

There are four possible explanations for the relationship:

(1) That the ovarian tumour itself produces adrenal cortical hormones. There should then have been adrenal atrophy, and significant amounts of steroids might have been found in 18 g. of tumour tissue excised from the diaphragm at necropsy; but this was not the case.

(2) That the liver, heavily infiltrated with ovarian-tumour secondary deposits, might have failed to inactivate the adrenal steroids, production of which is occasionally increased in those dying as this patient did. There is no evidence of failure of inactivation from the results of the first urine analysis, since excretion of conjugated tetrahydrocortisone and tetrahydrocortisol was exceptionally high. But the excretion of the tetrahydro compounds two months later was within the normal range, while free cortisone and cortisol were still increased. This suggests that failure of liver function in steroid conjugation may have begun at this late stage.

(3) That the patient would have developed either Cushing's syndrome or carcinoma in the natural sequence of events, there being no evidence for a causal relation.

(4) That the stress of severe and longstanding malignant disease might have provoked hyperactivity of the adrenal of sufficient intensity to provoke Cushing's syndrome.

It is possible, however, that the basic fault lies in the adrenal gland, which on stimulation oversecretes hormones not only inducing the typical upsets of Cushing's syndrome but also promoting neoplasia. Of these various possibilities we tend to favour (4).

Conclusion

In a case of Cushing's syndrome diabetes, hypertension, hirsutism, skin changes, and electrolyte disturbances developed rapidly in association with a poorly differentiated adenocarcinoma of the ovary with extensive secondary deposits.

There was a high output of adrenal cortical hormones and no evidence of failure of hepatic inactivation until the terminal stage.

Hypertrophied adrenal cortical tissue was found at necropsy.

The adrenal cortex hyperfunction and ovarian carcinoma may have had an undefined common cause.

We wish to thank Dr. A. Gilpin, under whose care the patient was admitted, for encouragement to publish; Dr. B. S. Cardell for the postmortem findings and help with the microphotography; Prof. T. Symington for his valued opinion on the adrenal-gland tissue: Prof. C. H. Gray for his help and guidance at all stages of preparation; and the board of governors of King's College Hospital for a grant to one of us (B. R.).

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Preliminary Communications

INCREASED EXCRETION OF HYDROXYPROLINE IN MARFAN'S SYNDROME

HYDROXYPROLINE is unique in that it is present in the body almost entirely in collagen. For this reason, the determination of this aminoacid has been used to estimate the amount of collagen in various animal tissues. Ziff et al.[1] reasoned that a significant deviation in the metabolism of collagen might be reflected in altered levels of excretion of hydroxyproline in the urine. These workers were unable, however, to demonstrate any abnormal excretion of hydroxyproline in a group of patients with one or another of the so-called collagen diseases. In the course of studies on a variety of clinical conditions, we have found that several patients who had been diagnosed as having Marfan's syndrome had an increased urinary excretion of total hydroxyproline.

All subjects received an unrestricted diet at the time when twenty-four-hour collections of urine were obtained. Total urinary hydroxyproline was measured by a modification [2] of the method of Wiss,[3] and urinary peptides were measured by the method of Balikov and Costello.[4]

As is shown in the accompanying table, in 7 out of 10 cases of Marfan's syndrome the daily excretion of hydroxyproline was greater than that found in a group of 12 normal volunteers, and in 6 it was greater than that in 38 patients with various other diseases. Our values

DAILY URINARY EXCRETION OF TOTAL HYDROXYPROLINE

Group	Sex	Age (yr.)	Clinical features*	Hydroxyproline (mg. per day)
Normals	6 M, 6 F	18–25	None	14·0–38·7
Misc. diseases †	18 M, 20 F	20–77	None	11·8–42·5
Marfan's syndrome:				
Case 1	M	17	s, o	101·6
„ 2	M	19	s, o	74·4
„ 3	F	24	s, o	106·0
„ 4	M	19	s, o	73·8
„ 5	M	21	s, o	56·7
„ 6	M	18	s, o, c	91·9
„ 7	M	30	s, o, c	43·5
„ 8	M	17	s, o, c	30·1
„ 9	M	18	s, o (?)	22·3
„ 10	F	28	s (?)	17·9

* s = skeletal. o = ocular (ectopia lentis). c = cardiovascular.
† Include rheumatoid arthritis, scleroderma, arteriosclerotic and hypertensive cardiovascular disease, pulmonary emphysema, bronchial asthma, regional ileitis, ulcerative colitis, Hodgkin's disease, hereditary cerebellar ataxia, obesity, and aneurysm of aorta of unknown cause.

for the latter two groups (normal 14·0–38·7 mg. with median of 25·1 mg.; miscellaneous diseases 11·8–42·5 mg. with median of 22·9 mg.) are comparable to those reported by Ziff et al. (normals 14·9–33·0 mg. with median of 21·8 mg.; miscellaneous diseases 11·3–37·1 mg. with median of 21·1 mg.). 3 patients (cases 8–10) had values which were within the normal range. Case 8 had skeletal-ocular-cardiovascular involvement and appeared to be a typical case of the disorder, but there was reasonable doubt about the clinical diagnosis in cases 9 and 10. In no instance did the free aminoacid constitute more than 10% of the total hydroxyproline. Total urinary peptides were within the normal range, the average being 2·5 g. per day.

It appears that at least some patients with Marfan's syndrome have an abnormal excretion of hydroxyproline. Whether the increased urinary hydroxyproline represents a general metabolic disturbance or a renal excretory defect remains to be established. It would seem important to study the metabolism of this aminoacid in both affected and unaffected members of the same family, as well as to establish the prevalence of the chemical abnormality in a larger group of patients.

Details concerning the methods used in these studies, and observations on other clinical conditions, will be presented elsewhere.[2]

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CONTRACTION OF COLLAGEN FIBRES IN VIVO INDUCED BY INFLAMMATION

IT is an old observation that fibrous tissue, under pathological conditions, may undergo a slow and permanent contraction. Outstanding examples are the stenosis of heart valves in rheumatic heart-disease, the shrinkage sometimes observed in scars, the deformation caused by Dupuytren's disease. The mechanism of this contraction has not been adequately explained. Only one fact seems to be clear: in each instance, the structure which is primarily involved is rich in collagen fibres. Hence pathologists have long accepted as an established fact the notion that collagen fibres are capable of contracting within the tissues.[1] Surprisingly enough, this traditional

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concept is based entirely upon circumstantial evidence: a measured shortening of collagen fibres in their living environment, to our knowledge, has never been directly demonstrated.

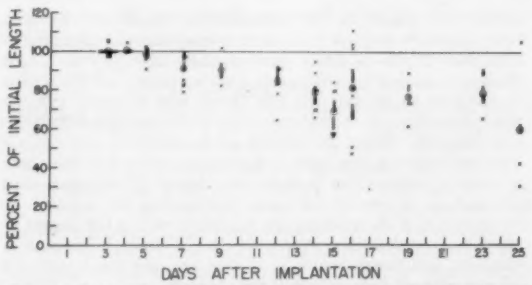
On the other hand, and rather paradoxically, it has been known for over a century that collagen fibres can very easily be made to contract in vitro. If a preparation of native collagen, such as a strip of fresh tendon, is immersed in boiling water, it suddenly contracts to a third or a quarter of its original length. If the preparation is gradually heated, the shrinkage is found to occur within a relatively narrow temperature range, which varies with the nature of the preparation, but lies approximately between 55° and 65°C. Known as thermal shrinkage, this phenomenon has been extensively investigated, both because of its theoretical interest and its importance in the process of leather manufacture.[2-7] The main component of the hide is collagen, and the process of tanning is largely aimed at preventing the hide from shrinking when heated. In fact, a large portion of the literature on thermal shrinkage is to be found in journals of the leather trade.

This striking property of the collagen fibres has received very little attention in medical literature. It has been used occasionally as a tool in the study of the chemical composition [8 9] or of the experimental denaturation [10] of collagen; whereas very few studies have dealt with thermal shrinkage itself, in relation to physiological or pathological events. It was found only recently that the shrink temperature varies with age.[11 12] The clearest implication of thermal shrinkage with pathological conditions is perhaps to be found among the traditions of the South American head-hunters, whose truculent trophies are said to be shrunken—as might be expected, to a third or a quarter of the original size—by dipping the carefully boned preparation into a cauldron of hot water.[13]

It would be very interesting to find out whether collagen may take an active part in the phenomena of pathological contraction in vivo by a process related to that of thermal shrinkage. The work here reported represents a first step in this direction: it is shown that under certain circumstances collagen fibres are capable of contracting quite considerably within the living tissues.

MATERIALS AND METHODS

The experiments were based on the following line of thought: if the collagen fibres are at all capable of shrinking in vivo, it seems likely that they would do so when their normal connective-tissue environment were in some way pathologically altered. The experimental approach, then, should be to devise a system whereby collagen fibres of known length could be maintained in an abnormal environment within the body. It seemed that this could be achieved by preparing measured segments of tendon and implanting them into the subcutaneous tissue or in other extraneous sites. Homografts of rat-tail tendons were therefore performed.



Changes in length of 150 segments of rat-tail tendon, implanted subcutaneously for varying periods into recipient rats. Each cross represents one preparation. The circles represent the average value for each stage. See text for further explanation.

Segments of tendon 4 to 5 cm. in length were prepared from the tails of donor adult rats. In each tendon two knots were tied 2 to 4 cm. apart, and the distance between them was measured to the nearest 0·5 mm. under standard tension. In preference to simple or double knots, which tended to slip, the following procedure was used: (1) two loose ties are made in the tendon; (2) a thread of black surgical cotton is passed through the loop of each loose tie and firmly knotted; (3) the tendon is then gently stretched, and the loose ties are drawn tight. Thus each tie in the tendon includes a knot of thread, which prevents it from slipping, and at the same time acts as a marker. 150 such preparations were implanted subcutaneously into 40 rats. Three to twenty-five days later the animals were killed, and the tendons recovered and measured under the same conditions.

All preparations were slightly swollen, and shrinkage had occurred in most of those which had been implanted for seven days or more (see figure). One tendon had contracted to about 30% of the original length—i.e., to the same degree as a tendon submitted to heating. After periods longer than three weeks most tendons broke up at the knots and began to be resorbed. During the first stages of contraction the tendons also acquired a considerable degree of elasticity, and in several cases, when the measurement was performed under tension, this elasticity was sufficient to offset the shrinkage: hence the apparent elongation of several preparations shown in the figure.

In control preparations suspended in vitro in 0·9% NaCl for four weeks at 37°C, no changes in length occurred. The shrink temperature, measured in distilled water with a standard method [11] on tendons which had been implanted for varying periods of time, was found to be 1° to 3°C lower than that of control tendons simultaneously heated.

DISCUSSION

The experiments indicate that a segment of rat-tail tendon, implanted subcutaneously, undergoes a slow and apparently irreversible contraction. Since the tendon is composed of elementary units, the collagen fibres, it seems reasonable to infer that the shortening of the tendon is due to a contraction of the single collagen fibres.

While this is precisely the result we had hoped to obtain, it also raises a rather puzzling question: why should a tendon maintain its normal length if left in its proper site, and shrink when transplanted to another site? The answer was provided by an incident which was at first equally puzzling.

Two of our collaborators, who were directly responsible for the implantation of the tendons, noticed that the best samples of contracted tendons were obtained from the first animals operated on, whereas in subsequent experiments the degree of shortening was clearly reduced.[14] There had been no

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intentional change in the experimental conditions; in fact, both operators noticed with some dismay that the decrease in shrinkage began to occur just as their operative skill and efficiency seemed to have reached an optimum. At this point it occurred to us that the key factor was probably not the transplantation per se, but rather the accompanying inflammatory reaction. When the records of the previous experiments were examined in this light, it became apparent that there was a clearcut relationship between the degree of shrinkage and the amount of granulation tissue surrounding the tendon. In other words, if the tendons are implanted with a fair degree of clumsiness and sepsis, they will elicit a lively inflammatory reaction, and hence contract; if they are implanted with the proper surgical skill, they will not contract.

It seems, then, that the abnormal environment which causes the collagen to shrink is provided by some property of the inflammatory exudate. This interpretation is clearly supported by experiments in which the same animal received two types of grafts: on one side, tendons coated with a few crystals of hydrocortisone; and on the opposite side, control tendons without hydrocortisone. The hormone-treated tendons elicited almost no inflammatory reaction, and their shortening (compared with that of the controls) was correspondingly slight. The converse approach was attempted in other experiments, in which the inflammatory reaction around one set of tendons was exaggerated by implanting each preparation after it had been loosely braided with two lengths of surgical cotton. The " braided " tendons, as expected, contracted more than the controls.

In our view, it seems more than likely that the contraction observed in vivo should be dependent upon the same basic molecular mechanism which is responsible for the shrinkage occurring in vitro. Exposure to heat is by no means the only condition which will cause the collagen molecule to recoil: the same effect can be obtained, even at body temperature, by a number of simple chemical agents.[2] We are now attempting to identify the property of the inflammatory exudate which acts upon the collagen fibres.

Our experiments indicate that collagen fibres are capable of contracting in vivo, through prolonged exposure to a focus of inflammation. Whether this phenomenon actually plays a role in the pathogenesis of connective-tissue contraction in human disease remains to be established, and the question is now under study. It is certainly suggestive that many of the typical pathological contractions should develop in conjunction with chronic inflammation.

SUMMARY

Segments of rat-tail tendon, implanted subcutaneously into other rats, underwent a slow and progressive shortening. This was attributed to a shrinkage of the collagen fibres, by a mechanism similar to that of the so-called thermal shrinkage. The extent of the contraction was dependent upon the severity of the inflammatory reaction surrounding the implant; thus, when inflammation was inhibited with hydrocortisone, the contraction was also inhibited. These findings are discussed in relation to the pathogenesis of the contraction of connective tissue, such as is observed in a number of human diseases.

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INSULIN IN PROTEIN FRACTIONS OF SERUM FROM HEALTHY PEOPLE AND FROM INSULIN-TREATED DIABETICS

IT has recently been shown by us that two protein fractions of normal human serum prepared by zone electrophoresis on columns of treated cellulose exert an insulin-like effect on the uptake of glucose by isolated rat diaphragm.[1,2] These are a fraction in the albumin/α_1-globulin zone and a fraction in the β-γ globulin zone. Ox insulin (native or ^{131}I-labelled), either alone or in the presence of normal human serum, migrates on electrophoresis with a mobility corresponding to the albumin/α_1-globulin zone. Because of this we concluded that the insulin-like effect of the albumin/α_1-globulin fraction of normal human serum was due to free circulating insulin. Although it seemed probable that the insulin-like effect of β and γ globulin fractions was due to insulin whose electrophoretic mobility had been altered by combination with some other serum protein, we could not be certain of this, because of the possibility that some serum constituent other than insulin might increase glucose uptake by diaphragm.

We have now sought to establish that the effect of these fractions is also due to insulin by the use of an antiserum to ox insulin prepared in guineapigs by the method of Moloney and Coval.[3] We have found that such antisera can completely neutralise the effect on glucose uptake by diaphragm both of ox insulin and of β and γ globulin fractions prepared from ox serum by zone electrophoresis. Thus it would appear that normal human serum may contain both free insulin (migrating on electrophoresis in the albumin/α_1-globulin zone) and " bound " insulin—i.e., insulin with an altered electrophoretic mobility possibly as a result of combination with some other serum-protein (migrating in the β-γ globulin zone).

Essentially similar results were obtained with protein fractions prepared from the serum of diabetic patients treated for many months with insulin; insulin antiserum again completely neutralised the insulin-like effect of the β and γ globulin fractions on uptake of glucose by diaphragm. Our observations concerning the presence of insulin in β and γ globulin fractions of serum from insulin-treated diabetics accord with several recent reports that the β-γ globulin fraction of the serum of such individuals contains an antibody which binds ^{131}I-labelled insulin added to the serum.[4–6] It had not been shown hitherto that such serum-protein fractions contain circulating insulin, nor had it been shown that they contain or are capable of releasing insulin which is biologically active.

The present observations also appear to show that the patterns of distribution of insulin in protein fractions of serum from healthy people and insulin-treated diabetics are similar. We do not yet know whether the " bound " form of insulin which appears to be present in the β-γ globulin fraction of normal human serum is identical with or different from that which is present in a similar fraction of serum from treated diabetics.

A full account of these investigations will be submitted for publication elsewhere.

We wish to thank Prof. F. G. Young, F.R.S., for much helpful advice and encouragement. The cost of these investigations was

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partly defrayed by grants for research expenses from the Medical Research Council to P. J. R. and from the British Diabetic Association and the Elmore Research Fund of the University of Cambridge to K. W. T., who is an Elmore research student.

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Medical Societies

BRITISH ORTHOPÆDIC ASSOCIATION

THE annual meeting of the Association was held on Oct. 2–4 in Oxford, under the presidency of Mr. NORMAN CAPENER.

Sir HARRY PLATT delivered the first founders' lecture, to mark the fortieth anniversary of the founding of the Association in November, 1918. He described his memories of the Association's earliest years and of the personalities with whom he was associated in its foundation, and suggested too where the Association's future might lie.

Some of the other papers are briefly summarised here.

Vascularity of Bone

Prof. J. TRUETA (Oxford) said that for the past ten years they had in the laboratories at Oxford studied the vascularity of bone. They had collected data supporting the view that the vessels reaching the plate from its epiphysial side were mainly concerned with the nutrition of the repeatedly dividing cartilage cells, whereas the peculiarly arranged vessels underlying the plate from its metaphysial side were mainly, and perhaps only, concerned with the calcification of the giant cartilage cells. The experimental surgical interruption of these metaphysial vessels, or their occlusion by pressure, caused a total failure not only of calcification but also of degeneration of the giant cells, showing that calcification was the essential prerequisite to degeneration. A picture radiographically and histologically similar to rickets was thus obtained and growth was consequently affected.

Growth of Femur

Mr. J. D. MORGAN (Oxford) spoke on factors influencing the growth of the human femur. If the capital epiphysis closed early from congenital deformity, injury, infection, or paralysis, the trochanteric epiphysis took over control of longitudinal growth, and any operative procedures in such circumstances must therefore avoid damaging the latter. It was only if both parts were closed that gross shortening occurred. At the lower end interruption of growth commonly affected only part of the epiphysial plate, resulting in both shortening and distortion of the bone. Ischæmia, as in Perthes' disease, promoted growth in circumference of the epiphysis and hence widening of the bone. Disuse of the lesser trochanter, as in iliopsoas paralysis, resulted in failure of this area of the shaft to thicken normally.

Congenital Coxa Vara

Mr. E. W. SOMERVILLE (Oxford) said that in this condition growth in length was no longer possible at the upper end of the femur. He thought that the fact that the inferior epiphysial artery supplied also the lower part of the neck could account for the presence of the triangular fragment of bone so commonly seen in this region in this disorder, and that there could be a small area of normal epiphysial plate between it and the adjoining part of the capital epiphysis. If such secondary ossification occurred fast enough elsewhere in the neck some sort of epiphysial plate might develop there also, but not such that could produce any significant growth in bone length. Damage very high up to the ascending branch of the nutrient artery of the shaft might prevent the formation of a metaphysis to the neck while preserving that to the greater trochanter, with the result that growth in length occurred here and the neck was left behind.

Arthrodesis of Shoulder

Mr. D. M. BROOKS (London) and Dr. A. ZAOUSSIS (Athens) reviewed arthrodesis of the shoulder in the reconstructive surgery of paralysis of the upper limb. Of fifty operations between 1943 and 1957 twenty-eight were for brachial plexus injuries, and in thirteen of them an amputation had been done at the same time as the arthrodesis. Failures of fusion in six of the latter were considered to be due to the difficulty of plaster fixation in these circumstances. They recommended a method in which the acromioclavicular joint was preserved and the spine of the scapula was excised and used as a graft thrust through a hole drilled through the humeral head into the glenoid.

Anterior Vertebral Fusion

Mr. W. DE WYTT (Dublin) reviewed forty-five cases of anterior vertebral fusion. For the early case he had found this operation so satisfactory that he now used it in all suitable patients after a month's preliminary therapy with streptomycin combined with isoniazid and *p*-aminosalicyclic acid.

Tendon Grafting

Prof. PAUL BRAND (Vellore) said that tendon transfers were more regularly successful than tendon free grafts because they had no suture line in the length of the tendon to cause adhesions, and because they carried their own blood-supply and therefore did not need to grow new blood-vessels which attached them to surrounding structures along their length. Frequently, however, it was difficult to spare a muscle with a long enough tendon without causing secondary disability from the loss of the muscle's original function. In such cases a tendon free graft from a more proximal muscle might be necessary. Secondary deformities following the Bunnell sublimis operation had led him to use a new operation using free grafts from a wrist-moving muscle. During 200 tendon free graft operations for intrinsic paralysis of the hand he had worked out new methods which had improved their effectiveness by minimising adhesions around the grafts.

Bone Grafts

Mr. R. G. TAYLOR (Oxford) discussed the use of bone grafts in malposition and non-union of fractures of shafts of long bones. If closed reduction failed or needed repeating more than ten days after the fracture, he considered open reduction and fixation by grafting to be usually the method of choice.

Bone-grafting Materials in the Dog

Mr. J. CHALMERS (Edinburgh) and Dr. H. A. SISSONS (London) said that in young adult dogs a cavity prepared in the cancellous bone of the lower part of the femur was filled with bone chips of standard size prepared from rib bone, either fresh or preserved. In each series of dogs two grafting materials were compared by inserting one into each femur. The types studied were fresh autograft, fresh homograft, frozen homograft, autoclaved homograft, freeze-dried homograft, deproteinised bone, decalcified homograft, and freeze-dried irradiated homograft. The results showed measurable differences, fresh autograft stimulating rather more new bone formation than fresh homograft. All types, however, behaved in the same general way and the differences with few exceptions were unimportant. No graft showed surviving osteocytes. The choice of method of preservation for banked bone could, it seemed, be governed by convenience rather than by any significant biological advantage of any particular method, and freeze-dried bone sterilised by gamma-irradiation apparently had practical advantages.

Low-back Pain

Dr. DAVID L. FILTZER (Baltimore) discussed low-back pain on the basis of vascular insufficiency. He reviewed fifty cases (including forty-three males) that had been under the care of Dr. H. T. Bahnson at the Johns Hopkins Hospital.

All had suffered occlusion of the lower aorta or the common iliac arteries; 22% had back pain.

In fifty the diagnosis had been proven by aortography and/or operation for endarterectomy or replacement by a homograft. A tentative diagnosis of vascular insufficiency should be considered in every patient with backache. Back or leg pain coming on after exertion and rapidly relieved by rest, with fatiguability of thighs and calves, numbness and tingling of the legs, a " dead feeling ", coldness of the legs and feet, and loss of potentia, should clinch the diagnosis even without laboratory aids. Palpation of the femoral and peripheral pulses must be part of the routine examination of all patients with low-back pain.

Correction of the Pronated Foot

Mr. G. K. ROSE (Shrewsbury) said that the peritalar joint behaved as a simple hinge on an axis passing obliquely through the head of the talus. Any gliding movement apparently occurring at the subtalar joint in fact took place at the " calcaneo-contact " articulation, the heel rolling like a wheel on its contact surface—the ground. This movement altered the axis of the peritalar joint and caused movement of the head of the talus in an almost horizontal plane, the head moving medially as the foot pronated. A support *under* the talar head acting in a vertical direction as in the ordinary valgus insole was futile in the prevention of this movement. Wedging the heel of the shoe, or better still a wedge under the medial side of the os calcis, limited to some extent the rolling over of the os calcis and pressed the upper suitably against the talar head, but the upper soon deformed unless specially strengthened. Heel cups of the type described by A. J. Helfet were much more effective in transmitting the vertical force of the body-weight into a transverse horizontal force pushing the head of the talus laterally.

Reviews of Books

Medicine and the Navy

Vol. II (1649–1714). J. J. KEEVIL, D.S.O., M.A., M.D., surgeon commander, R.N. (retd.). Edinburgh and London: E. & S. Livingstone. 1958. Pp. 332. 40*s*.

THE first volume of this history, published last year, was widely acclaimed. This success was partly due to the fact that no comparable account of the Navy's medical history had previously been written, but, much more, to the diligence and scholarship the late Commander Keevil applied to his task; and the balance of the work was eagerly awaited. When the author died, the second volume was still in proof, and the final stages have been completed by his wife, and by his friend Dr. Edwin Clarke.

It is concerned with the period from the Commonwealth to the end of Queen Anne's reign—some sixty-five years, during which the Navy doubled in size and undertook commitments overseas at steadily increasing distances from its home ports. Several major actions were fought at sea against the fleets of Spain, France, and Holland. But much of this fighting was close to the British coast (Evelyn, on more than one occasion, heard the Dutch guns from London) and the medical problems it posed differed only slightly from those which had confronted the Government a century before. What were new were the difficulties caused by a growing number of ships being deployed, hundreds or thousands of miles from established bases—in West Indian waters, for instance. Such voyaging raised complex difficulties of victualling, control of shipboard epidemics, and prevention of deficiency diseases.

Commander Keevil has shown how the Navy, at first ill-equipped, gradually evolved answers. In 1649 ships carried surgeons, but no man with any knowledge of physic. Casualties were ferried ashore at the earliest opportunity and were then laid as a charge upon local authorities, who were often understandably reluctant to nurse seriously ill sailors for a fee of a shilling a day. In 1654 the first physician to the fleet was appointed; and the earliest definite record of a vessel being commissioned as a hospital ship dates from 1665. The difficulties of lodging naval patients in civilian hospitals led to the establishment of special hospitals at Plymouth (1672) and at Greenwich (1695). And the exertions of men like Pepys did much to amend the appalling diet of the ordinary seaman. By 1714 then, the year at which the volume ends, the Navy had a medical service, ashore and afloat, which was well-organised by contemporary standards. But one which had substantial strides to make before it became capable of supporting the exertions of such men as Howe, Nelson, and Hood in the century which followed.

We hope that Commander Keevil's splendid example will encourage another to complete the work he began so well.

Tuberculosis in White and Negro Children

Vol. 1. *The Roentgenologic Aspects of the Harriet Lane Study*. JANET B. HARDY, M.D. Pp. 122. Vol. 2. *The Epidemiologic Aspects of the Harriet Lane Study*. MIRIAM E. BRAILEY, M.D. Pp. 103. Cambridge, Mass.: Harvard University Press. London: Oxford University Press. 1958. £3 each volume.

THE Harriet Lane Tuberculosis Clinic of the Johns Hopkins Hospital was established in Baltimore in 1928 for a long-term study of tuberculosis in white and Negro children. These volumes record some of the results of the study, using the histories of 1329 children, 437 white and 892 Negro. The first volume is largely an atlas of the abnormal X-ray appearances in tuberculosis. The plates are of good quality and adequately cover the subject. There are useful sections on the interpretation of children's chest radiographs and the technique of bronchography and bronchoscopy.

The second volume is a study of the prognosis of tuberculosis in children not treated with antibacterial drugs (the follow-up ceased in 1950). Over a period of fifteen years the mortality of infected white children under 3 years of age was estimated to be 9%; in the corresponding Negro children it was 22%. Between the ages of 3 and 15 the rates were 0·8% and 8% respectively. An important observation was made concerning the risks of continued exposure to infection in the household. For infected Negro children who were not subsequently exposed to known risk, the probability of developing progressive pulmonary tuberculosis within ten years was about 2%; on the other hand, for children exposed to infection for varying periods after the discovery of the primary tuberculosis the probability was three times higher.

These volumes are valuable records of a long painstaking investigation and are worth studying closely.

Diseases of the Liver and Biliary System (2nd ed. Oxford: Blackwell Scientific Publications. 1958. Pp. 719. 57*s*. 6*d*.).—It is no surprise that a second edition of Dr. Sheila Sherlock's excellent textbook has been called for so soon. The emphasis on the functional and morphological changes of hepatic disease rather than on the diseases themselves has obviously been successful, and she has wisely refrained from any major reconstructions. She has, however, incorporated a remarkable amount of new material, among which the sections on hepatic coma and hepatocellular failure are outstanding. The illustrations are of high quality, but the value of the cartoon-style diagrams is questionable. Despite the inclusion of 37 new figures and 500 new references to the recent literature, the size of the book has been slightly reduced. There has been a modest increase in price.

Atlas de radiologie clinique de la presse médicale (Series 1–100, 1953–58. Paris: Masson. 1958. Pp. 400).—This atlas was compiled from interesting articles on radiology in *La Presse Médicale* during the years 1953–58. The form of presentation is unusual. Each article, or a précis of it, is reprinted on a double foolscap sheet and the series is published unbound in a loose-leaf file. The reader must use the index to extract the sheets dealing with various anatomical systems, since each sheet is numbered according to the date of first publication. Printed on glossy paper the reproductions are usually of good quality, and line drawings supplement some of the radiographs. The book is an interesting review rather than an atlas comprehensive in detail.

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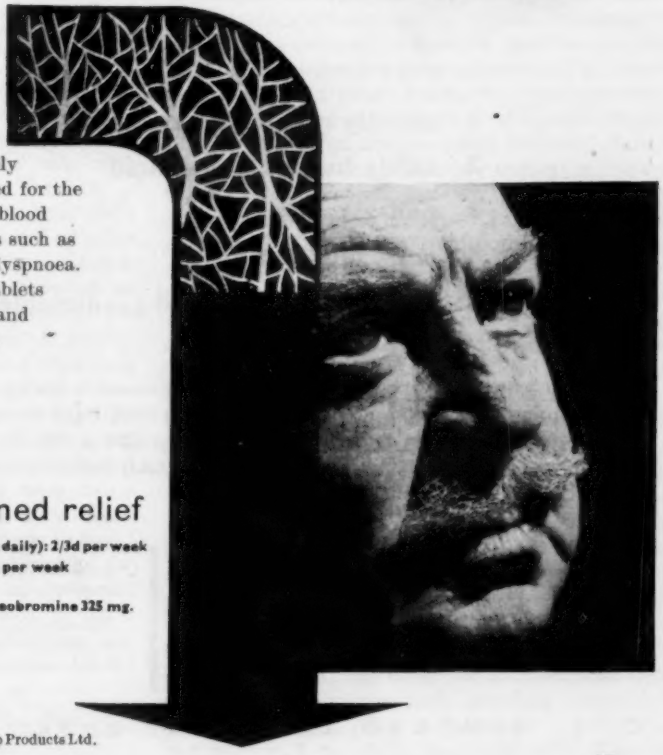

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THE LANCET
LONDON 8 NOVEMBER 1958

Leukæmia and Radiation

STATISTICS from many countries have shown in the past thirty years a considerable increase in the incidence of leukæmia and the allied reticuloses, and it is now generally agreed that the increase is much greater than can be accounted for by better diagnostic methods and changes in nomenclature. KAPLAN,[1] for example, pointed out that in 1950 leukæmias ranked fourth or fifth among the causes of death from malignant disease in the U.S.A., being more numerous than the recorded deaths from malignant disease of the trachea, bronchus, and lungs. LEA and ABBATT,[2] using British data, showed that the increase affected all age-groups except young adults between 20 and 34. Four pieces of evidence suggested that increasing exposure to ionising radiation may have some connection with this rise in leukæmia. First, there is the recorded incidence of leukæmia among survivors of the atomic bombs exploded at Hiroshima and Nagasaki; secondly, the reported increase in leukæmia among radiologists; thirdly, the higher leukæmia-rate in patients who have received courses of radiotherapy for ankylosing spondylitis [3]; and finally the work of ALICE STEWART and her colleagues [4 5] in Oxford, which has suggested that some of the acute leukæmia in children is related to X-ray examination of the mother's pelvis and abdomen during pregnancy. These observations have been widely interpreted as meaning that the increase in leukæmia and allied conditions is very largely due to increasing exposure to radiation, in the form of X rays used in medical diagnosis or of other additional man-made radiation, such as that generated by the test-firing of nuclear weapons. Doubts have long been voiced about the validity of this conclusion and the evidence on which it is based. For one thing, among British radiologists COURT BROWN and DOLL [6] found a significant excess of cancer deaths (tumours of skin and pancreas and *possibly* leukæmia) only in those who started to practise radiology before 1921. And the publication of STEWART's preliminary figures was followed by a vigorous debate about their significance. It now seems possible to assess the position more accurately, and in the present state of knowledge it is reasonable to conclude that exposure to radiation cannot account for more than a small proportion of the recorded increase in leukæmia.

SCHWARTZ and UPTON [7] noted the estimate of LEWIS [8] that increased background radiation could account for 10–20% of the spontaneous incidence of leukæmia, assuming that the leukæmia-rate increased in linear relation with the radiation dose—an assumption that may be wrong. LEWIS's estimate is a maximum, and even 20% leaves many cases of leukæmia for which other causes must be found. SCHWARTZ and UPTON point to several possibilities for inquiry: the relatively high leukæmia-rate among city-dwellers, compared with country-dwellers, which may be connected with atmospheric pollution by carcinogenic hydrocarbons; the increasing use of drugs that are potentially toxic to the bone-marrow; and the apparently greater incidence of leukæmia in the wealthier socio-economic classes. This important question has now been subject to another critical examination—by Sir MACFARLANE BURNET,[9] in his Cutter lecture at Harvard earlier this year. A new development in the age-distribution of leukæmia is a peak in the group aged 3–4 years, a peak not seen, BURNET points out, in the coloured population of the United States. Turning to the report of COURT BROWN and DOLL [10] on the relation of high doses of therapeutic X rays to leukæmia, BURNET notes how uncommon leukæmia is, even under these circumstances. "In round figures, the incidence among men not given radiation is about 0·5 per 10,000 per annum. For doses over 1750r to the spinal marrow, the incidence rises to 16 or 17 per 10,000 in the most completely studied group, and in the whole series to a level of 72 per 10,000 for doses above 2250r. Even this is only 0·7 per cent per annum." COURT BROWN and DOLL thought it reasonable to adopt the working hypothesis that there was no threshold dose below which leukæmia could not be induced. If this is so, as BURNET observes, "the relation by which ionising radiation induces the change in a cell resulting eventually in leukæmia is of the same character as the process in a germ cell resulting in a genetic abnormality. In other words, the trend of present opinion is toward the acceptance of somatic mutation as a necessary (but not necessarily sufficient) cause of leukæmia." From the preliminary findings of STEWART et al.,[4] BURNET concludes that their proper significance is displayed if the figures are set out so as to indicate that, of 100 cases of leukæmia in childhood, 84 had no experience of irradiation in fœtal life. "Of the 16 who had received such radiation, a little more than half can be subtracted as being 'destined' to suffer from leukæmia without radiation, so that only 7 per cent of childhood leukæmia can be ascribed to irradiation. Nevertheless, the fact of radiation appears to double the chance of leukæmia in childhood from about 1 : 2000 to 1 : 1000, and if x-rays were used in all pregnancies, the over-all incidence of leukæmia in childhood would be nearly double its present figure."

BURNET's summing up is that there is no doubt that ionising radiation produces leukæmia and that the dose-effect relation is linear and without threshold. He considers LEWIS's figures to be of the right order and he believes that "one would not be wrong in ascribing between 5 and 10 per cent of cases of leukæmia to ionizing radiation, half being due to inescapable background and half to man-made radiation, almost all in

1. Kaplan, H. S. *Cancer Res.* 1954, **14**, 535.
2. Lea, A. J., Abbatt, J. D. *Lancet*, 1957, i, 389.
3. Court Brown, W. M., Abbatt, J. D. *ibid.* 1955, i, 1283.
4. Stewart, A., Webb, J., Giles, D., Hewitt, D. *ibid.* 1956, ii, 447.
5. Stewart, A., Webb, J., Hewitt, D. *Brit. med. J.* 1958, i, 1495.
6. Court Brown, W. M., Doll, R. *ibid.* July 26, 1958, p. 181.
7. Schwartz, E. E., Upton, A. C. *Blood*, 1958, **9**, 845.
8. Lewis, E. B. *Science*, 1957, **125**, 965.
9. Burnet, M. *New Engl. J. Med.* 1958, **259**, 423.
10. Court Brown, W. M., Doll, R. *Spec. Rep. Ser. med. Res. Coun., Lond.* 1957 no. 295; see *Lancet*, 1957, i, 1130.

the form of medical x-rays". Though the particular reasons for arriving at such a figure may be debated, the figure itself is probably correct, and it follows that only a very small proportion of the increase in leukæmia is due to ionising radiation; but leukæmia attributable to fallout from nuclear-weapon tests may approach the more pessimistic "no-threshold" estimates of the United Nations committee.[11] What *is* responsible for the greater part of the alarming and logarithmic increase in this lethal group of diseases? BURNET thinks we must try to answer this question within the next ten years, before increasing general exposure to radiation obscures the picture. By looking at the problem epidemiologically and adding some hints from laboratory work on leukæmia, he suggests certain lines of inquiry that may be fruitful. The peak of incidence between 3 and 4 years and the latent period between exposure to radiation and the development of leukæmia suggest exposure to a mutagenic stimulus about the time of birth. The search must be directed towards something associated with pregnancy or neonatal care which has become "progressively more available in the United States, Australia and England since 1942, to the upper social classes before the lower, and seems to be rather conspicuously absent in the American Negro's way of life". Since ionising radiation, including X-radiation of the pelvis in pregnancy, seems to be acquitted of any prominent role, BURNET looks to the possibilities of a virus or the influence of a mutagenic chemical. He is doubtful about the relevance to human leukæmia of the experimental work on viruses as a cause of mouse leukæmia.[12] For one thing, there is no evidence to suggest that a new type of virus with the necessary properties appeared in pandemic form in 1942–43 and has remained prevalent since; until some directly relevant laboratory evidence of virus infections is obtained, this theory cannot be strongly supported. Work on the role of chemical mutagens has hardly begun, and BURNET emphasises that we should look for something connected with changing social habits or with obstetrical and neonatal care in the early 1940s. Possibilities are cigarette-smoking in women, changes in the drugs commonly used in pregnancy (in the control of morning sickness, for example, or in the induction of anæsthesia for delivery), and changes in artificial feeding methods. And in this new search less well-explored aspects of radiation must also be included—for example, the effect of eating foods in which naturally occurring radioactive substances are concentrated. The design of these inquiries will no doubt include more prospective studies than have so far been attempted. Two weeks ago we published ABBATT and LEA's[13] report of a retrospective inquiry into possible leukæmogens, in which they found an association between leukæmia and (*a*) irradiation and (*b*) the rheumatic diseases. Their evidence did not enable them to explain these associations; and, though ABBATT and LEA and others have by painstaking effort extracted much valuable information from this type of investigation, it may be that retrospective surveys will never provide a definite answer.

Ionising radiations may not be so prominent a cause of leukæmia as at one time seemed likely, and the search for chemical agents or other possible physical causes must be vigorously extended so that exposure to risk can be reduced whenever possible. The medical application of X rays must be critically examined, particularly their use in abnormal pregnancies; but it would be unsound to forgo too readily the benefits of radiology because of a relatively small risk of inducing leukæmia.

11. See *Lancet*. Aug. 16, 1958, pp. 355, 360.
12. See *ibid*. July 5, 1958, p. 30.
13. Abbatt, J. D., Lea, A. J. *ibid*. Oct. 25, 1958, p. 880.

The Nephrotic Syndrome

When FRIEDRICH MULLER used the term nephrosis [1] it was his innocent intention to separate purely degenerative forms of renal disease from those of toxic or inflammatory origin. It was in this sense that it was accepted by VOLHARD and FAHR [2] when they passed the ill-fated word into a systematic classification of renal disease—one of the many unsatisfactory attempts to categorise disorders of the kidney. It was EPSTEIN [3] who extended the original concept. He drew attention to the low serum-albumin and high serum-cholesterol levels, and associated the œdema with reduced colloid-osmotic pressure in the blood. Since then much has been argued and written, and from these simple beginnings a structure of supposition grew and bedevilled successive generations of students and confused endless clinical discussions until it was shattered by the blistering broadside from JEAN OLIVER in 1950.[4]

Now that the dust has settled it is reasonable to think again of what is meant by nephrosis. The answer is simple: albuminuric hypoproteinæmia of sufficient severity to cause œdema. Many causes are known, and more suspected; it is a syndrome—the nephrotic syndrome. But, however it is caused, it has the same clinical features—namely, œdema, at first slight and subcutaneous, later gross and associated with transudates into the body's potential spaces; increased susceptibility to infection; and malaise. There may be other features, but these, like the age of onset, sex-distribution, course, and prognosis, depend on the exact cause of the proteinuria. And on this, too, depend associated features, such as hypertension or nitrogen retention.

Examination of the urine in the nephrotic syndrome always reveals heavy proteinuria; 50–80% of the protein is albumin, and the remainder the smaller globulins. These proteins can be shown to be immunologically identical with the serum-proteins, which themselves are qualitatively normal.[5] On the other hand, the larger protein molecules—for example, the α-globulins and the β-lipoproteins—scarcely appear in the urine at all. This renal loss of protein may initially be compensated for by increased synthesis of albumin, but ultimately leads to a fall in the serum-albumin level and therefore to reduced colloid-osmotic pressure. Consequently water and salt pass into interstitial spaces, with reduction in circulating-

1. Muller, F. *Verh. dtsch. path. Ges*. 1905, **9**, 64.
2. Volhard, F., Fahr, T. Die Brightsche Nierenkrankheit. Berlin, 1914.
3. Epstein, A. A. *Amer. J. med. Sci*. 1917, **154**, 638.
4. Oliver, J. *Amer. J. Med*. 1950, **9**, 88.
5. Squire, R. J., Blainey, J. D., Hardwicke, J. *Brit. med. Bull*. 1957, **13**, 43.

plasma volume. This may cause increased secretion of aldosterone, and therefore increased tubular reabsorption of sodium and more accumulation of interstitial fluid—pull devil pull baker, in fact.

Many other abnormalities have been found to be common to most cases of nephrosis. A low basal metabolic rate has been recorded; this may be due to nothing more than the body's increased surface-area consequent on gross œdema; but RASSMUSSEN [6] has shown that considerable quantities of thyroxine may be lost bound to protein in the urine, and attributes the resistance shown by these patients to thyroid to this cause. The level of serum-calcium may also be reduced. This can be accounted for chiefly by reduction in the serum-albumin; but the ionised fraction is also reduced, and for this there is no ready explanation. A moderate fall in the level of serum-potassium is common; this is due partly to increased excretion caused by the raised aldosterone secretion, and partly to decreased ingestion from anorexia. The differential filtering of protein molecules of varying sizes, together with the reduced plasma-volume, may account for the raised levels of the α and β globulins which are sometimes found, and in particular for the raised lipoprotein levels. Other fatty substances may also be increased—phospholipids, which normally are carried on albumin molecules, and neutral fats, which may be associated with α_2-globulin. The metal-binding proteins, transferrin and cæruloplasmin, are also lost in the urine, and the serum-iron level and iron-binding capacity, together with the serum-copper level, are all low. On the other hand there is a considerable increase in the serum levels of cholesterol and pseudo-cholinesterase. These substances, and the albumin, are thought to be synthesised chiefly in the liver. All decrease in chronic liver insufficiency. Why then do two increase and one decrease in the nephrotic syndrome? Can it be that there is increased synthesis of all three, and that the liver is actually providing more albumin than normal and is yet failing to keep pace with the renal loss? Should we, in fact, think of the nephrotic syndrome as "high-output liver failure" secondary to renal disease? There is some evidence that we should. Recent studies with human serum-albumin labelled with ^{131}I have shown evidence of greatly raised albumin turnover, confirmed the increased rate of albumin disappearance, and revealed increased albumin synthesis.[7 8] The fall in the serum level of albumin must reflect the difference between what is lost by the kidney and what can be synthesised by the liver.

It is clear that the basis of the nephrotic syndrome is the proteinuria. How then may this occur? Small quantities of protein are known to pass the normal glomerules, and to be absorbed in the proximal renal tubule. The content of protein in the glomerular filtrate is not known in man, but may be up to 5 mg. per 100 ml.[9 10] Proteinuria may therefore arise in two ways: excess protein appears in the glomerular filtrate, or else protein reabsorption by the tubule is reduced. Nor are these necessarily mutually exclusive. The former may result either from increased permeability of the glomerular filter or from an increase in the glomerular filtration pressure. It is probable that the proteinuria of congestive cardiac failure and constrictive pericarditis represents an increase in filtration pressure; but in the absence of liver disease it is not usually great enough to cause serious reduction in the serum-albumin. On the other hand renal-vein thrombosis, with or without thrombosis in the inferior vena cava, is recognised as an infrequent cause of the nephrotic syndrome.[11] Presumably in this case the glomerular filtration pressure is much greater. Increased permeability of the glomerular filter is also well recognised; it may be a sequel to acute hæmorrhagic glomerular nephritis, or be associated with systemic lupus erythematosus, diabetic nephropathy, or amyloidosis [12]; indeed, diabetic nephropathy has been said to be the commonest cause of the nephrotic syndrome in this country.[13] The nature of the glomerular change may vary; recent studies with the electron microscope have demonstrated basement-membrane changes in diabetes mellitus,[14] and changes in the epithelial-cell foot processes in systemic lupus erythematosus. Moreover by this technique changes in the epithelial cells have been shown to exist in some cases of the nephrotic syndrome when no other cause can be detected.[15] The light microscope increased our powers of visual resolution a thousandfold; the electron microscope has done as much again. Much that was invisible now awaits our inspection. Who can doubt that we stand on the threshold of a new era in histology?

In the nephrotic syndrome the cells of the proximal renal tubule may be swollen and vacuolated, and their contents rich in fat. Less commonly they are flat, with poorly staining nuclei.[16] The constancy of these changes has led many to the belief that therein lies the fundamental cause of the nephrotic syndrome, and to the evolution of such terms as "pure lipoid nephrosis". But these changes might be a consequence of the cells being presented with an abnormal glomerular filtrate—one that is too rich in fat and protein. That this can be so has been brilliantly demonstrated by OLIVER,[17] and there is little doubt that in the majority of cases the tubular changes are secondary to glomerular lesions—lesions that may be invisible by light microscopy. But this is not to say that decreased protein absorption by the tubules could not produce the nephrotic syndrome. If 200 litres of fluid pass the glomerular filter in twenty-four hours, and each litre contains only 50 mg. of protein, then the urinary loss would be 10 g. daily if tubular reabsorption ceased altogether; this is probably enough to outstrip the liver's powers of synthesis. Nor does it

6. Rassmussen, H. *J. clin. Invest.* 1956, **35**, 792.
7. Pearson, J. D., Veall, N., Vetter, H. Sonderdruck aus Radioaktive Isotope in Klinik und Forschung; vol. III, p. 290. Berlin, 1958.
8. Veal, N., Vetter, H. Radioisotope Technique in Clinical Research and Diagnosis; p. 327. London, 1958.
9. Rather, L. J. *Medicine*, 1952, **31**, 357.
10. Sellers, A. L., Griggs, N., Marmorston, J., Goodman, H. C. *J. exp. Med.* 1954, **100**, 1.
11. Harrison, C. V., Milne, M. D., Steiner, R. E. *Quart. J. Med.* 1956, **25**, 285.
12. Muehrcke, R. C., Pirani, C. L., Pollack, V. E., Kark, R. M. *Guy's Hosp. Rep.* 1955, **104**, 295.
13. Milne, M. D. *Postgrad. med. J.* 1954, **30**, 640.
14. Irvine, E., Moon, H., *in* Biochemical Disorders in Human Disease (edited by R. H. S. Thompson and E. J. King); p. 536. London, 1957.
15. Hall, B. V. Proceedings of the 6th Annual Conference on the Nephrotic Syndrome; p. 1. New York, 1954.
16. de Wardener, H. E. The Kidney; p. 92. London, 1958.
17. Oliver, J. *J. Mt Sinai Hosp.* 1948, **15**, 175.

mean that decreased tubular reabsorption never causes the nephrotic syndrome. When the kidney is poisoned with metals, such as arsenic, lead, gold, or uranium, not only is heavy proteinuria induced but changes can be detected in the proximal tubular cells. Renal glycosuria and aminoaciduria—both evidence of proximal tubular dysfunction—may occur, and even more complex derangements have been reported in nephrotic children.[18] There seems to be every reason to suppose that proximal tubular disease, often genetically determined, accounts for a small proportion of cases of the nephrotic syndrome. Moreover, microscopical abnormalities of the proximal tubule have been demonstrated by nephron dissection in the rare condition of congenital nephrosis.[19] Probably fever and drugs, such as troxidone, act in the same place.

Renal-function tests are unpredictable. In most cases a normal or increased glomerular filtration-rate can be demonstrated by insulin or urea-clearance; and when it is grossly increased there may be an associated reduction in the blood-urea. But increase in glomerular filtration-rate is by no means invariable, and its absence need not invalidate the diagnosis. Tests of tubular function are usually normal. Much the most useful investigation is percutaneous renal biopsy,[20] especially if it can be combined with nephron dissection[21] and electron microscopy.

Treatment is still largely symptomatic. It is directed to draining the interstitial space of fluid and sustaining the serum-albumin. To this end very high protein diets are often recommended; but it is common experience that, if the renal loss of protein continues, these are useless, although they may increase the blood-urea. If the liver is already synthesising albumin to its maximal capacity, then clearly extra dietary protein can do no good. It seems more rational to give only enough to prevent negative nitrogen balance. But a high-calorie diet is necessary to prevent endogenous tissue breakdown, for if this occurs then the effect is the same as giving a diet rich in protein and potassium. Reducing the volume of the interstitial fluid is useful, because of both the mechanical inconvenience of œdema, and the susceptibility of œdematous tissues to infection. The volume may be reduced by restricting dietary salt with or without adminstration of kation-exchange resins, or by increasing salt excretion by means of diuretics. There is probably no harm in using organic mercurials—essentially tubular in action—in cases where the lesion is thought to be glomerular. But the chief aim of treatment should surely be, not to reduce the interstitial fluid, but to increase the plasma-volume. This would reduce the stimulus to aldosterone secretion and the consequent sodium and water retention and potassium loss. Here undoubtedly the most useful drugs are the steroid hormones, both for their direct action on the renal glomerulus, and for their indirect action whereby the adrenal gland's secretions are suppressed—though it is noteworthy that in the case reported this week on p. 988 by Dr. WILLIAMS and Major RYAN, where the nephrotic syndrome was preceded by immunisation against typhoid and tetanus, there was no response to cortisone or prednisone but excellent diuresis and long remission followed intravenous administration of concentrated albumin. In one or two special cases there is a specific treatment. In renal-vein thrombosis long-term administration of anticoagulants may be life-preserving. In a few cases secondary amyloidosis has responded to healing of the primary lesion. In general there is no specific remedy; for there are few specific causes, and there are many unexplained and largely untreatable cases. It is by the application of modern diagnostic techniques that we can hope to progress.

18. Stanbury, S. W., Macauley, D. *Quart. J. Med.* 1957, **26**, 7.
19. Darmady, E. M., Stranack, F. *Brit. med. Bull.* 1957, **13**, 24.
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Annotations

NOBEL PRIZES

HALF of the 1958 Nobel prize for medicine goes to Dr. Joshua Lederberg, professor of genetics in the University of Wisconsin, and the other half jointly to Dr. G. W. Beadle, professor of biology at the California Institute of Technology, Pasadena, and to Dr. E. L. Tatum, of the Rockefeller Institute for Medical Research, New York. The prize for chemistry has been awarded to Dr. Frederick Sanger, of Cambridge.

The collaboration of the geneticist Beadle with the biochemist Tatum has led to advances which are equally fundamental for both branches of biology. Working with the bread mould, neurospora (which, on a medium containing only mineral salts, a sugar, and biotine, can synthesise all its aminoacids, vitamins, purines and pyrimidines, &c.), they established that mutant genes which interfere with biosynthesis do so in a very specific way: they generally block a single step in the synthesis of a single substance only. This work represents not only a major advance in the understanding of gene action, but also opens the way to a deeper analysis of intermediate metabolism by the study of gene-controlled metabolic blocks.

The fundamental work of Lederberg (partly in collaboration with Tatum) has been carried out with *Escherichia coli*, and the genetical markers used included biochemical mutants, as in the neurospora studies. Sexual reproduction was discovered by the demonstration of genetic recombination following the mixing of genetically different bacterial cultures; and it could be shown that the genetic material is arranged in linear order, as in the chromosomes of higher organisms. A completely novel phenomenon is "transduction" of part only of the genetic material from one bacterium to another, with a bacterial virus (phage) as the vector; the transducted material becomes incorporated into the "chromosome" of the recipient, and these observations raise new possibilities about the relationship between bacterial genes and bacterial viruses.

Dr. Sanger began his study of the structure of insulin in 1943, when the aminoacid composition of the molecule was already well established. His first work was on the determination of the end-groups of the molecule, in which he developed his own method using fluorodinitrobenzene. His major work, however, was the complete elucidation of the aminoacid arrangement in insulin—the first, and so far the only, protein molecule to have its structure

completely determined. Sanger showed that it was possible, using the methods of acid and enzymatic hydrolysis followed by paper chromatography, to split a protein into peptides whose sequence could be determined. This jigsaw puzzle of peptides he was able to fit together to make the molecule. Although insulin is very small compared to most proteins—it is composed of 51 amino-acids arranged in two chains of 30 and 21—the complete determination of its structure was a landmark in chemistry. In describing this achievement, Dr. Sanger acknowledged the patient work of his collaborators—especially Dr. H. Tuppy of the University of Vienna. Dr. Sanger is now trying to correlate the biological activity of insulin with its chemical structure, and is making exploratory investigations into the possibility of synthesising peptides with insulin activity. He and his group are also developing new techniques for the study of protein structure using isotopic labelling, which they hope will be of value in the study of much larger proteins.

VIEW FROM NORWAY

As director of health services in Norway, as former chairman of the World Health Assembly, and as a keen observer of different countries, Dr. Karl Evang has a wider view of medicine than most of us attain. The first of the Heath Clark lectures he has been giving this week at the London School of Hygiene and Tropical Medicine was both spirited and challenging.

The health services of a country, he pointed out, reflect the main principles which govern the national life; but they need not do so "100%", and they can be used as a testing-ground. He distinguished four main types of health service—the Western European, the American, the type evolved by the People's Republics, and the type which is gradually taking shape in so-called underdeveloped countries.

The Western European preserves the dualism by which curative medicine is separated from public health and they are financed and administered through different channels. The system is extremely complex, with central authority divided between Ministers, and much decentralisation of local responsibility. The lawyer or lay administrator occupies a relatively strong position and the health expert is often used only as adviser.

Under the American system as much as possible is left to private enterprise and competition—in a free market where doctors are guided by a unique combination of medical and business ethics. The dualism of curative and preventive medicine is perpetuated: services to individual people are preferably reserved for private practitioners, and public health is concerned only with groups. The public-health administration is in a much stronger position than it is in Europe, but in a limited sphere. The political influence of the medical Association is stronger than under any other system, and research is favoured; but, if there is more diversity, the inner contradictions are also greater than elsewhere.

In the People's Republics, society has taken over responsibility for all medical services, and the words "public-health service" have no meaning. But the principle was long ago accepted that a medical service must meet the wishes of the people, and the authorities have had to satisfy the public demand first for more curative medicine and secondly for more specialists. A strong decentralising trend is weakening the central authority: it has gone farthest in Yugoslavia. The economics of the service are very simple and research is encouraged. All important positions in the health service, including that of Minister, are held by doctors; and the Ministry of Health has a stronger position in the Government than it has under other systems.

The undeveloped countries are still living in an emergency period, and coping, under geographical and other difficulties, with communicable diseases and malnutrition. Funds must come from central sources and medical work must therefore be planned; but lack of personnel often makes it impossible to do the things with highest priority. Neither the Western European nor the free-enterprise system is directly applicable to these countries: and though their advisers come from the West, their medical picture rather resembles that of the People's Republics.

The question which system is best, Dr. Evang thinks, is academic: it depends on what one wants. It has been said that the medical services of the U.S.A. are primarily economic, those of Western Europe primarily humanitarian, and those of the Soviet bloc primarily utilitarian; but this, he felt, would be very hard to substantiate: there is only one type of human being throughout the world. All the systems are capable of reaching a high level, but all show the distance between what exists and what could exist if present knowledge were fully used. Some lag between research and its application is inevitable; but there is also delay because medical institutions are rigid and do not adapt themselves quickly enough. There are vested interests, not only economic but also professional; and ill-informed sections of the public can also obstruct progress. As for the growing tendency to ask that the health service should *pay*, this must be utterly rejected by doctors: if we give in to the salesman's scale of values we are lost. Money is only a symbol, whereas health is the fundamental investment of any society. Yet where are the doctors (he asked) when standards of living, housing, nutrition, and "permissible" radiation are being decided? Do we stand up for optimal levels, or do we ask only for survival?

THE ANTI-GRAVITY SUIT

COLLAPSE due to blood-loss seldom requires more spectacular treatment than blood replacement, provided the bleeding can be stopped. In a desperate case the blood may be pumped in under pressure, or several transfusions can be given at the same time. Gardner et al.[1] describe an exceptional case in which, although prodigious quantities of blood were given, including infusions into four veins simultaneously and directly into the aorta, and vasoconstrictor agents were administered, bleeding continued and the patient went downhill until an anti-gravity suit was applied to the lower part of the body. The modified anti-gravity suit (commonly called the "G-suit") which was used had been developed primarily to prevent postural hypotension during neurosurgical operations with the patient in the sitting position. The suit consists of a large plastic inflatable bladder which is wrapped around the lower half of the body like a large blood-pressure cuff, and then inflated to the desired pressure. The case in which it was used was as follows:

A multiparous patient, aged 36, was delivered of a stillborn child in the sixth month of her pregnancy. Delivery was followed by a frightening gush of blood and immediate shock. Manual exploration of the uterine cavity showed that half the placenta was separated, but that the other half was completely adherent to the uterus and could not be detached. The separated part of the placenta was removed and the uterus firmly packed while fluids were given intravenously and a blood-transfusion was set up.

Laparotomy was performed, and an area 20 cm. in diameter was found which resembled the fœtal surface of the placenta

1. Gardner, W. J., Taylor, H. P., Dohn, D. F. *J. Amer. med. Ass.* 1958, **167**, 985.

on the anterior wall of the lower part of the uterus. When this area was explored it became clear that the myometrium had been completely replaced by the placenta in this area, and that there was no cleavage plane between placenta and bladder. Hysterectomy was performed with difficulty; troublesome bleeding could not be completely controlled even with figure-of-eight sutures and oxidised cellulose. By the end of the operation the patient had received 11 units of blood and 3 litres of 5% dextrose solution in water.

It soon became clear that the bleeding was continuing. Seven hours after hysterectomy the abdomen was reopened and 3½ litres of clotted and liquid blood was removed; 1 litre of this was filtered and retransfused. The patient was extremely shocked and was receiving infusions of blood or fluid into four veins simultaneously. After an operation lasting six hours during which many vain attempts were made to stop the bleeding, it was decided that the prognosis was almost hopeless. Nine large packs were placed in the peritoneal cavity and the incision was closed over them. The patient was returned to her bed; sandbags were placed on the abdomen, the legs were wrapped with elastic bandages, and the foot of the bed was raised. At this point, eighteen hours after delivery, she had received 55 units of blood (the "unit" is not defined, but it appears to be 500 ml.); the blood-pressure was 86/62 mm. Hg, and the pulse-rate was 140.

In an effort to compress the bleeding area more effectively, the G-suit was wrapped about the patient so as to encompass her from the ankles to the epigastrium, and was inflated to 20 mm. Hg. She soon began to improve, and her blood-pressure gradually rose to 114/80 mm. Hg, although the pulse-rate increased to 160. Twenty-four hours after delivery, after the administration of only 1 additional pint of blood, the pulse-rate began to decrease, and when the G-suit was removed after it had been in place for twenty-four hours there was no significant change in the pulse-rate or blood-pressure. Some time later the abdomen was reopened and the packs were removed. No further bleeding followed. The convalescence was stormy, but the patient was discharged on the fifty-fourth day.

Gardner et al. remark that there was some difference of opinion as to whether the final control of bleeding was due chiefly to the use of the G-suit, intra-abdominal packs, or 2 units of fresh uncitrated blood which the patient received. As a result of this experience they used the G-suit in another case, in which 20 units of blood was required within twenty hours to combat hæmorrhagic shock. Here again, after the suit was applied only 1 additional unit of blood was required to restore and maintain the blood-pressure level.

Consideration of the first of these two cases inspires admiration of the valiant efforts which were ultimately rewarded. The anti-gravity suit represents one further method of treatment which may be tried after—or even before—all else has failed.

ASSESSMENT OF FRACTURE UNION

UNION of fractures is usually assessed by clinical and radiographic criteria. Free movement between the fragments is convincing evidence that union has not yet occurred; but local tenderness, and pain on straining the fracture, are of much less significance. In certain regions, particularly where union is slow and uncertain, it is customary to await radiographic confirmation; but often this delays weightbearing and the return to full activity.

There is clearly need for a method which determines when the process of union has reached an irreversible stage. Perhaps the work of Siegal et al.[1] will provide a basis. Measurement of the velocity of sound has long been used to test the quality of materials, but its application to fracture union is new. The method consists in sending a brief sonic pulse through a leg by means of a transmitting transducer. In the laboratory animal the tibia was then fractured, and conduction in the normal tibia was compared with that in the bone with a healing fracture. The velocity of conduction was reduced across the fracture, and this returned to normal only when union was complete. A small series of patients with tibial fractures was examined, and reduction of sound velocity was also observed. It is unfortunate that serial observations on these patients were not made. Nevertheless, this method may well have clinical applications once its limitations have been more clearly defined.

1. Siegal, I. M., Anast, G. T., Fields, T. *Surg. Gynec. Obstet.* 1958, **107**, 327.

GLASGOW'S M.M.R. CAMPAIGN

IN 1957, 37 mass-miniature-radiography units were assembled in Glasgow to X-ray in a five-week campaign as many as possible of the city's inhabitants. The organisational details and the early results have now been published.[1] 714,915 people (76% of the population) were X-rayed (a record number for a short campaign) and 2755 cases of active pulmonary tuberculosis (3·8 per 1000 examined) were brought to light. A further 5379 cases of significant tuberculosis of doubtful activity were also discovered. There was a higher pick-up rate of active tuberculosis in men than in women (4·8 as against 2·8 per 1000 examined). Further analysis showed that, as expected, this was due to the relatively high incidence of disease in older men.

The report gives a valuable account of the complex arrangements for X-raying the multitude and expeditiously dealing with those found to have disease; but there is no doubt that most interest will centre on how such a high proportion of the population were persuaded to come forward. The secret of success is thought to have been the comparative shortness of the campaign and the intensity, ubiquity, and effectiveness of the publicity. This was directed by a special committee which included newspaper editors and representatives of the cinema and B.B.C. A million pieces of publicity material, including 100,000 posters, were issued; every omnibus and tramcar in Glasgow and three out of four shops carried posters. "Stunts", such as the distribution of prizes, were balanced by serious explanations of the aims of the campaign. Although all forms of publicity were helpful, the most potent factor was the sustained barrage from press, broadcasting, and cinema. It was thought indeed that if more X-ray units had been available to cut queueing, over 80% of the population would have been examined. What of the fish that got away? There was no evidence that they were bigger than the ones which were caught: among 6576 contacts X-rayed after the campaign only 17 new cases were found—a case-rate lower than that of those who attended. The total cost of the campaign was £114,269, which worked out at 3*s*. 2*d*. per examination, £16 4*s*. per new active and observation case, and £44 11*s*. per new active case. Publicity cost £17,000 or 5¾*d*. per X-ray—an expenditure which was obviously well justified.

The organisers of the Glasgow campaign are to be congratulated on a spectacular success, and their experience should prove of great value to planners of similar enterprises.

1. Glasgow's X-ray Campaign Against Tuberculosis, March 11 to April 12, 1957. Published by Corporation of Glasgow. Obtainable from Town Clerk, Glasgow. 5*s*.

The Wider World

INFERTILITY AND DEPOPULATION
A STUDY OF THE MURUT TRIBES OF NORTH BORNEO

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TEMPORARILY APPOINTED TO THE NORTH BORNEO MEDICAL SERVICE

THE Muruts are a group of related pagan tribes inhabiting the interior of the Crown Colony of North Borneo and part of Indonesian Borneo. They are small, stocky mongoloid people, with light brown skin and straight black hair. They have been relatively isolated because they were practising headhunters until recently, and they live in remote hilly jungle, poor in natural resources and communications. Since the British North Borneo Company was founded in 1882 they have been more closely influenced by the outside world. On the edge of Murut territory there are two big rubber estates which employ Muruts as temporary workers, and two large Government stations with Chinese shops. Government officials make occasional journeys deep into Murut territory.

The Murut at home lives in a semi-permanent house with several other related families. Surrounding the house are temporary gardens made by felling and burning the forest, which are planted with hill rice, vegetables, and the staple crop, tapioca (fig. 1). Animal food from jungle and stream is often plentiful, especially wild pig. Money is not used in everyday life, but nowadays many goods, such as salt, cotton cloth, lamps, kerosene, matches, crockery, and utensils, are bought from shops, and each able-bodied man must pay a small annual poll-tax. Money is earned by short periods of employment on rubber estates, by occasional casual work for the Government, and by the sale of produce on a small scale.

It has long been known that the Muruts are declining in numbers. Copeland (1935) ascribed Murut decline to the introduction of virulent subtertian malaria by imported labourers, but he was not able to demonstrate this introduction. Shircore (1937) investigated depopulation in the interior, and found definite evidence for frequent abortions, and deaths of mother and child. He thought that malnutrition, malaria, hookworms, gonorrhœa, and endemic goitre led to high maternal mortality and sterility rates and a low birth-rate, which he considered to be the immediate medical causes of depopulation. His recommendations for the formation of a malaria research unit and maternity and child-welfare services were carried out.

The first reliable census was in 1931, and since then the more careful census of 1951 showed that the Muruts had decreased by 23% (Jones 1953). This was a real decline due to the population not replacing itself, and was not caused by emigration or change of tribal name. These findings prompted the North Borneo Government to invite the investigations recorded here.

Initial surveys showed that although the Muruts carried a disease load and had a mortality-rate at all ages which would be excessively high for a civilised people, they were healthier and survived childhood more frequently than many other primitive groups, such as those in Malaya described by Polunin (1953).

One of the most noticeable features of the Murut population was the small number of children. The 1951 census (Jones 1953) showed that only 36·5% of Muruts were under 20 years old,* and the Murut woman who had completed her reproductive life averaged less than 2 surviving children (see table).

Fig. 1—The Muruts are sturdy people, used to carrying heavy weights over long distances. Porters wearing loin-cloths and modern shirts carry the investigator's equipment in back-baskets made of sago-palm leaf-stalks, through a forest clearing, planted with young hill rice and coffee bushes (foreground), banana and sugar cane (extreme left), and tapioca (top right).

Among Murut women ever married 40% (and 28% of those aged over 40 years) said they had had no live births. It has been found elsewhere, for several other groups of women who married at an early age like the Muruts, that less than 5% were childless (Lorimer 1954). This suggests that infertility is common among the Muruts, so an inquiry into it was carried out.

The Infertility Inquiry

The people studied presented themselves for the investigation of infertility, and there was some selection

* Murut ages are always estimated.

CHILDBEARING AND CHILD SURVIVAL FOR MURUT WOMEN (CALCULATED FROM JONES 1953)

Age (estimated in years)	15–	20–	25–	30–	35–	40–	45–	50–	55–	60–9	70+
Mean live births per mother for all North Borneo mothers *	1·32	2·00	2·73	3·87	4·71	5·21	5·43	5·38	5·30	5·20	4·93
Mean live births per Murut mother *	1·16	1·66	2·37	2·94	3·11	3·61	3·90	4·18	4·84	4·33	5·33
Mean live births for all Murut women	0·13	0·73	1·31	1·74	2·12	2·36	2·73	2·87	3·53	2·95	4·63
Mean surviving children per Murut woman	0·09	0·50	0·65	1·12	1·41	1·51	1·75	1·73	1·97	1·45	2·42

* Mothers are those women who have had a live birth.

against those who had previously borne live offspring. 27 Sapong Murut women with their 25 husbands were investigated on Sapong Rubber Estate.† When examined they had been living under unusual conditions for several months, occupying permanent labourer's quarters and working for wages, though most of their lives had been spent in their jungle homes. Also examined were 10 other women from the interior with various gynæcological complaints, including sterility in 7; and 23 infertile women from the neighbouring Kwijau tribe, who lived in villages where over half the married couples were reported to have no live offspring.

SAPONG MURUTS

The mean age was 26 years for women and 32 for men. Four couples had been married for less than two years, and over half the subjects had had more than ten years of married life. Childhood betrothal was common, but sexual intercourse was not sanctioned before the menarche, though it had occurred in 5 women. Intercourse among unmarried people was permitted and had occurred occasionally in nearly half the people. The 25 men had had a total of 11 divorces, though divorce is not usually so common among Muruts. There was no tendency for marriage between people of widely different ages. Though mates are usually chosen from a population numbering only a few hundreds, the barriers against consanguineous marriages are considerable, first-cousin marriages being considered major incest.

In spite of much inquiry and some hints to the contrary, there is no clear evidence for contraception, induced abortion, or other anti-natal practices among Muruts. Desire for children is widespread, and among Sapong Muruts was shown by the willingness to submit to our troublesome investigations, though there were exceptions among older women of childbearing age.

34 out of 51 people had palpable spleens. Adventitious respiratory sounds were heard in 7, and were probably not due to tuberculosis. The only common signs of nutritional deficiency were visible enlargement of the thyroid (11 cases) and palpable parotid glands (29 cases). Clarke (1951) found that these conditions were common in Muruts.

GYNÆCOLOGICAL ABNORMALITIES‡

Of the 27 Sapong Murut women 15 gave histories of 19 pregnancies which produced 11 abortions, 1 stillbirth, and 7 livebirths.

20 women had signs probably due to pelvic infection. The uterus showed restricted mobility in 16 cases, displacement in 16, and was normally anteverted in only 3 cases. 11 had inflammatory masses believed to be of the fallopian tubes, and 7 were tender on pelvic palpation. The other women showed similar findings, and in all 68% (41 out of 60) had evidence of old pelvic infection. Such women are unlikely to produce children, since blockage of the fallopian tubes would prevent conception in many, and pregnancy would probably end in abortion, adhesions preventing normal expansion of the uterus.

Infection of the female pelvic organs usually enters by the female reproductive tract. It follows abortion or labour, or can be unrelated to pregnancy if it is due to gonococci. Signs of pelvic infection were found in 88% (29 out of 33) of the women with a history of pregnancy and 44% (12 out of 27) of those with no history of pregnancy. Many of these latter may have been previously pregnant.§ Among those examined with no signs of pelvic infection only 19% (3 out of 16) had a history of pregnancy. This shows that the risk of pelvic infection is greater in those who have been pregnant. As the lesions ascribed to previous pelvic sepsis would usually prevent further pregnancy, they probably developed after and not before a pregnancy.

Fig. 2—A young Semambu Murut woman, newly delivered of a baby. She sits on the floor of the kitchen for four days and nights with her back to a small fire. If she wants to sleep she leans forward on the sling behind her head. The walls are of split bamboo.

One woman was suffering when examined from a puerperal infection and 13 others (including 8 Sapong Muruts) gave a history of post-abortion or puerperal fever. All of these except one who refused examination showed signs of pelvic infection. Infections following pregnancy seem to be the most important cause of the small numbers of children born to Murut women.

The causes of this high rate of pelvic sepsis are probably to be found in the management of pregnancy, labour, and the puerperium. During pregnancy women lead an active life and no harmful restrictions were found. The management of labour differs widely among different groups of Muruts. The woman is delivered in the squatting position, and is sometimes assisted by a close relative, who is too frightened to interfere dangerously. Among the Tagul Muruts, however, Saunders observed repeated vaginal examinations with unwashed hands by women who nevertheless could not diagnose an obstructed labour. Manual removal of the placenta soon after delivery is common. These practices increase the risks of puerperal infection.

After delivery the mother is often made to adopt the sitting position for four days and nights (fig. 2) " to promote involution of the uterus ". Urine and fæces are often voided through the slatted bamboo floor, which is sluiced down with water. The infant is fed at the breast on the slightest demand. It is unlikely that any special care is taken with abortions, since they are often not recognised.

Abortions were common, and the whole group of 60 women had histories of 25 abortions. Malaria and other fevers are thought to be important causes of these unsuccessful pregnancies, though only 6 abortions were said to be preceded by fevers.

Murut girls marry soon after the menarche, and Ashley Montague (1946) showed that abortion, stillbirth, premature labour, neonatal and maternal death-rates are increased at this age, though pregnancy is less likely to occur.

VENEREAL DISEASES

Sterility due to gonorrhœa has been claimed by some Muruts and medical officers to be the principal cause of Murut depopulation. Regester (1955) believes, however, that gonorrhœa is not sufficiently common to be able to produce a substantial fall in the birth-rate, and the only conclusive evidence for

† Sapong Estate was chosen because the management provided excellent facilities for the study of a large and accessible Murut population.

‡ Multigraphed copies of three tables, setting out the gynæcological findings in detail, may be had on application to the Editor, *The Lancet*, 7, Adam Street, London, W.C.2.

§ Histories of abortion were often only obtained after careful questioning, since Muruts only recognise the onset of pregnancy when a palpable abdominal tumour appears, and some have taboos against a woman announcing her pregnancy.

gonorrhœa in the present study was two positive gonococcal complement-fixation tests in 57 people. History, physical examination, and search for gonococci showed nothing definite. 7 out of 43 V.D.R.L. tests were positive, but these were probably due to yaws, which was common until recently.

EXAMINATION OF MALE GENITALIA

23 Murut husbands showed little abnormal except epididymal swelling in 6 cases, which was usually a unilateral, hard enlargement of the globus major, probably due to a previous epididymitis and scarring, which may have obstructed the vasa deferentia. Gonorrhœa, which usually affects the tail of the epididymis, or bancroftian filariasis, which often causes epididymitis (King 1944), may have been responsible.

Causes of Depopulation

Infertility

21 Sapong Murut women had had no live birth, and 15 of these showed evidence of pelvic sepsis sufficient to cause sterility. Taking the total Murut population in the 1951 census (Jones 1953), we find for women who had ever married, and who had the same age-group distribution as the Sapong Murut women, that 50% have had no live birth. If these Sapong women are typical of childless Murut women of similar age, we would expect about one third of Muruts to have their reproductive ability seriously impaired before producing a single live birth. Sepsis can also develop after a successful pregnancy. 12 out of the 13 mothers who were examined (including 6 Sapong Muruts) showed evidence of previous pelvic infection. Over 20% of Murut women of ages 35–44 who had married have had only 1 baby (Jones 1953), and many of these probably became sterile following pelvic sepsis. In the absence of infertility due to pelvic infection, Murut women would therefore produce during their reproductive life a significantly greater number of children, which might be adequate by itself to stop depopulation.

Other Factors

The mortality of children who have been born must be considered, since Murut depopulation is due to an excess of deaths over births. The accompanying table shows that the average Murut woman produces well over 2 offspring during her reproductive life but has less than the minimum of 2 surviving offspring needed to maintain the population.

The 1951 census showed that 38·7% of children of surviving Murut mothers had died. This loss of life, though serious, is not uncommon for a primitive community, where a stable population is usually achieved in the presence of high birth- and death-rates. Thus, the North Borneo Dusuns, among whom 34·6% of children of surviving women have died, apparently increased by 13% in twenty years (Jones 1953). In Liberia and New Guinea, Pointdexter (1953) and Van der Hoeven (1956) described primitive populations who apparently maintained their numbers in spite of worse survival-rates than those of the Muruts.

We are unable to say when Murut depopulation started, though the table suggests that child production has not replaced child loss for several decades. Decline has coincided with a period of greater contact with the outside world, leading to the introduction of new ideas, new practices, and new pathogens. The causes of depopulation probably lie in the direct and indirect effects of these changes. Shircore (1937) mentions two epidemics of smallpox between 1880 and 1906, and small "influenza" and measles epidemics still occur frequently and carry a high mortality. Epidemics have delayed effects which may even be more serious than their immediate mortality. They can leave dependants without support, and produce disablement and demoralisation.

The stopping of headhunting abolished one cause of death and much destructive effort, but it has helped the spread of communicable disease and has removed an important motivating factor in Murut life (Landgraf 1956). It is not suggested that Muruts sit down and die of demoralisation or boredom by some mysterious influence of mind over matter. Their mental states do, however, influence their actions and their energies. It is possible to see everywhere a decline in traditional arts and technology, and there may be a corresponding lowering of those material standards which maintain health.

Innovations from the outside world do not necessarily improve the Murut environment. Murut women in many areas have taken to wearing underpants, but as they are rarely washed they become heavily infected and may promote pelvic infection. Somewhat similar changes are occurring in housing. Muruts working on the Sapong estate live in well-built permanent quarters. Dirt accumulates on the impervious rough floors of these buildings, while it falls between the smooth and washable bamboo floor-slats of their original homes. Changes in clothing and housing and the abolition of headhunting were also mentioned by Rivers (1922) as factors promoting Melanesian depopulation. It is probable that the Muruts will decrease further because of the high proportion of old and sterile people; but as the main immediate cause of depopulation is disease due to unfavourable environmental influences which are mostly susceptible to change, the population could become stabilised and could again start to increase.

It is easy to describe several unfavourable influences promoting Murut depopulation, but they also operate among many other aboriginal peoples in South-East Asia, who do not appear to be decreasing, and it is difficult to see why depopulation should particularly affect the Muruts.

Possible Remedies

Satisfactory medical care of the Muruts is impracticable because of their inaccessibility and sparse population no matter how much the Medical Department expands. Malaria is probably the chief cause of Murut mortality and an important remote cause of Murut infertility. The Government/W.H.O./UNICEF residual house-spraying project which is now under way among the Muruts can be expected, if it proves successful in controlling malaria, to increase births and decrease deaths, as has happened elsewhere where malaria has been successfully controlled (Dowling 1953).

There is the greatest need for improvement in the standards of maternal and child care. The fixed and travelling dispensaries which work deep in Murut country are staffed by men who are not trained in maternal and child health, nor are their services requested by the conservative womenfolk. Trained Government-paid village midwives have been valuable, but they practise on the edge of Murut country. One of the most hopeful efforts has been to persuade those Murut women who regularly deliver babies to attend a hospital for six weeks. They are there taught habits of cleanliness and the avoidance of meddlesome midwifery, and it is hoped that they will spread this knowledge when they return to their homes. In this way a fairly permanent effect could be achieved.

The serious population problems of the Muruts seem to have developed recently and to be indirectly due to an increase in outside contacts. It is important that these contacts should include more medical help if the Muruts are to stop decreasing.

Summary

The Muruts are pagan hunters and shifting agriculturalists inhabiting the jungles of the interior of North Borneo. Between 1931 and 1957 their population diminished by 23%, because births did not replace deaths. The unusual demographic feature of this population is that 40% of the women ever married have produced no live offspring, and families are small.

Signs of old pelvic infection (usually fixed or retroverted uteri or tubal disease) were found in 20 out of 27 Murut women who complained of infertility. Pelvic infection, usually developing after pregnancy, is held to be the chief cause of Murut infertility. Malaria and other infections are thought to be the principal cause of many pregnancies which end unfavourably. 38·7% of liveborn offspring of surviving Murut women have died, but such wastage is compatible with an increase in population, given normal child production.

Though some further decline is expected, many of the causes of Murut depopulation can be removed, so the Muruts are not doomed to extinction. Similar adverse factors are widespread in other neighbouring aboriginal populations whose numbers appear not to be declining.

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Special Articles

"FOR ERECT LATERAL ONLY, PLEASE"

A NOTE ON THE VALUE AND LIMITATIONS OF THE ERECT LATERAL RADIOGRAPH OF THE PELVIS IN PREGNANCY

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SINCE the recognition of the probable association of antenatal radiological examination with leukæmia (and other forms of malignant disease) in children, there has been a considerable reduction in the number of patients referred for X-ray examination during pregnancy. The majority of radiologists have taken appropriate steps to limit the amount of radiation reaching the fœtus during antenatal examination. There is, however, one trend which demands inquiry and discussion—namely, the common request for a single erect lateral radiograph, often as a substitute for adequate pelvimetry. The limitations of this restricted examination are clearly not fully appreciated, and an erect lateral film which appears to show pelvic adequacy may give the obstetrician a very false sense of the pelvic capacities.

The value of the *erect* lateral film has been appreciated for many years. It has been used routinely at Queen Charlotte's Hospital since 1943, in the elucidation of the "high head" problem and as part of the basic technique of standard pelvimetry. As a single-film technique, it was valuable in cephalometry with an engaging or engaged head, and in labour to judge the progress of descent of the head. By far its greatest usefulness was in cases of high head as judged by clinical examination. For many years it was the custom at Queen Charlotte's Hospital, when receiving a request for pelvimetry because of a high head, to take the erect lateral film first. If this showed engagement (which applied in 55–60% of the cases) the film was shown immediately to the referring obstetrician, who then decided whether the pelvimetry was to be completed. The erect lateral film provided a very convenient solution to many of the high head problems, and its use in this manner led to a considerable reduction in the amount of radiation received by the fœtus.

Since the possible untoward effects of antenatal fœtal irradiation have been statistically demonstrated there has been a great tendency for requests to be made for an erect lateral film only—as if this was adequate to replace thorough and complete pelvimetry, which should obviously provide information concerning the size and shape of the pelvis at all planes. It is desirable to draw attention to the limitations of this rather popular restricted request. The erect lateral film provides much information of value, but its important limitations are often overlooked.

The items of information which can be gained from an erect lateral film are:

1. Demonstration of the relationship of the head to the inlet, including the degree of engagement, as far as can be judged in one plane (two dimensions).
2. When the head is engaging or engaged, accurate cephalometry is possible in 60% of cases.
3. Demonstration of the sacral shape, of the degree of prominence of the sacrococcygeal shelf, and the probable degree of coccygeal fixity, of the width of the sacrosciatic notches, and of the plane of the symphysis pubis and the descending pubic rami.
4. The anatomical anteroposterior dimensions can be measured accurately, but the "effective" or "available" lower-strait anteroposterior diameters cannot be judged.

Information concerning the following is not available from the erect lateral film:

1. The shape and area of the inlet and the likely mode of initial descent of the head into the pelvic cavity.
2. The degree of convergence of the side walls of the pelvis.
3. The prominence of the ischial spines.
4. The width of the subpubic arch.

Useful and informative as the isolated erect-lateral film may be, it is essential to appreciate the definite limitations of its use and value. What appears to be an adequate pelvis from this single projection may, in the event, give rise to a significant and even serious lower-strait disproportion, with mid-cavity or outlet arrest. Some warning is forthcoming if the anatomical lower anteroposterior (pubosacral) diameter measures less than 11·0 cm.: (*a*) in a patient of general small stature with a corresponding pelvis, (*b*) with a straight sacrum with a near-vertical long axis, (*c*) with a well curved sacrum with a forward prominent sacrococcygeal shelf, (*d*) when there is abnormal coccygeal fixity by fusion to the sacrum.

My main purpose is to emphasise that, although the anteroposterior pelvic diameters may be average or even above average, there may be decidedly unfavourable dimensions or characters which could lead to serious disproportion but which will pass unrecognised from the erect lateral film alone.

The request for, and acceptance of, the erect lateral film only by the obstetrician must be supported by the knowledge from clinical examination that the lower pelvic straits are fully adequate concerning the subpubic arch, the ischial spines, and the plane of the lower pelvic side walls. Fortunately, significant side-to-side contraction at the brim (which is very difficult to detect clinically) is extremely rare. The pelvis deformed as a result of disease is now seldom seen, and in practice we are almost wholly concerned with the healthy woman, without bone disease, whose pelvis shows some relative smallness or some anatomical peculiarity or variant in developmental shape.

It may be argued that lower-strait contraction with an adequate upper strait is rare, but this is not my experience at Queen Charlotte's Hospital. I am not suggesting that it is common, but it is far from rare. The clinically unrecognised lower-strait contraction accounts for a significant proportion of the more hazardous instrumental deliveries.

The main practical purpose of the erect lateral examination concerns the high head, and, per se, it is of little further value in judging the adequacy of the pelvis as a whole. The use of the erect lateral film alone is no substitute for a complete modern form of radiological pelvimetry in women of small stature and in women who are suspected of having an unfavourable lower pelvic strait with especial emphasis on the narrow subpubic arch.

The evidence afforded by the erect lateral film as an isolated examination is of real and reliable value only when used strictly in conjunction with the knowledge gained from clinical examination concerning the subpubic arch, the ischial spines, and the pelvic side-walls. In a given case, if these features cannot be assessed clinically, it is justified to complete the pelvimetry in a manner by which the fœtus receives no unnecessary radiation.

Public Health

Infectious Diseases in England and Wales

Disease	Week ended October			
	4	11	18	25*
Diphtheria	5	25	10	4
Dysentery	442	512	658	525
Encephalitis:				
Infective	3	2	2	6
Post-infectious	..	1	1	1
Food-poisoning	316	230	259	228
Measles, excluding rubella	1988	2778	3740	4232
Meningococcal infection	12	14	14	29
Ophthalmia neonatorum	25	34	19	26
Paratyphoid fever	5	3	6	10
Pneumonia, primary or influenzal	211	216	251	263
Poliomyelitis:				
Paralytic	53	83	47	62
Non-paralytic	16	30	23	13
Puerperal pyrexia	207	253	215	212
Scarlet fever	657	649	795	803
Smallpox	—	—	—	—
Tuberculosis:				
Respiratory	494	484	507	481
Meninges and C.N.S.	6	4	10	6
Other	68	45	64	47
Typhoid fever	1	4	4	3
Whooping-cough	551	500	479	594

* Not including late returns.

Vital statistics.—The epidemiological and vital statistics of the world have again been collected in a single volume in English and French.[1] New features this year include detailed specific death-rates, by sex and age, for the main sites of malignant neoplasms, and the distribution of cases of communicable disease by sex and by age.

1. Annual Epidemiological and Vital Statistics, 1955. Geneva: World Health Organisation. 1958. Pp. 699. Obtainable from H.M. Stationery Office, P.O. Box 539, London, S.E.1. £3.

In England Now

A Running Commentary by Peripatetic Correspondents

"ONLY another ten minutes, old man," remarked my surgical colleague. My newly acquired registrar stirred himself into activity. Diplomatically I removed from his reach the syringes loaded with antidotes, and intercepted his message to the ward about the next "premed". When will these chaps learn something about the real art of anæsthesia, I asked myself for the hundredth time.

How can juniors, so little experienced in *The Assessment of Surgical Statements*,[1] predict accurately the expected duration of required anæsthesia, decide when to administer the next premedication (within the limits of effective action), and transmit correctly (and corrected) the various messages to the wards, the outpatients, and the surgeons' wives as may be required of them?

It is a traditional function of the anæsthetist that all such communications should pass through him. This is based on the assumption that in the theatre he alone is the person with little better to do, or whose occupation is of so little importance as to stand interruption. If this traditional duty is accepted, it is essential that such messages be passed on in an acceptable form, if only for the sake of good anæsthetic-surgical relationships.

Long experience has enabled me to evolve the necessary formula to translate "surgical time" into rational units. For the assistance of my less experienced colleagues, I now offer it to all:

$$\text{ETO} = \frac{(T - n) + x^2}{\sqrt{t_1 - t_2}} \times (Dt + k)$$

Where:
ETO = Estimated time of operation.
T = Time stated by operator.
n = Number of patients still on the list.
x = Exaggeration factor (applied if T = < 30 minutes).
t_1 = Time since lunch.
t_2 = Time before next appointment.
Dt = Differential constant (time stated + time already taken).
k = The Bulsch[2] factor (known standard deviation of operator × μ).

• • •

I never did have a high regard for examinations as a preparation for life. How often do I seem to recall it being said: "Now if the examiners ask you this, you had better play safe and say . . . but in fact of course most people know very well . . ." &c. In my young days we had to learn all those silly names of eye-signs in thyrotoxicosis which no-one ever bothered to elicit, and to have a detailed knowledge of the pathology of obscure diseases, like chlorosis and amyloid disease, that were, I am told, often seen by my grandfather, but not much since. And Madura Foot—they have pictures of this in textbooks but one doesn't see this odd rarity even in Madura nowadays (I've looked), let alone in S.E.5. But the medical-degree examination is a revelation of concrete value and good common sense compared with the driving-test, which my wife has lately faced.

In preparation for this ordeal she was taught: "Always start the car in first", even though with 18 horses and a fluid drive any gear below third is superfluous. "Before you start, check handbrake, gear-lever, make your signal, look in the mirror, start engine, engage gear, look in the mirror again, let in clutch." We knew one good lady who followed these instructions so faithfully that she passed the test first time, but she was so bogged down by this ecstasy of obsessional behaviour that the green lights were usually red again before she moved away. Then the questions they ask: *The Highway Code* says school signs are a torch, so the examiners expect this answer, though round here all the torches have been changed to the kids stepping off the pavement. Crawl at 5 M.P.H. round a couple of blocks making wild hand-signals at every turn and you've passed. Drive like an adult human

1. Von Gass, A. W. I. ff. The Assessment of Surgical Statements. 1st (and only) ed. Gasingham, 1895.
2. Bulsch, A. L. L. Time and Motion Studies in Various Surgical Procedures. 1900.

being without holding everyone else up and you're failed for not halting at all cross-roads (doesn't matter if you can see the stop-lines by the others), looking right, left, and then right again. A friend of mine from down under had to take a test here after some 17 years' accident-free driving. They asked him what a filter was and he said "Search me, cobber" or words to that effect. But he won out in the end by going to Eire where, on receipt of a small fee, the greathearted Oirish gave him a licence that would take him where he loiked for as long as he loiked and be-damned to the Ministry of Transport.

• • •

The death of Nugent Monck takes me back to my schooldays, forty years ago. He produced the school play, *A Midsummer Night's Dream*. As soon as he heard my voice, he cast me for the Lion and taught me how to roar. He seemed to me to take as much trouble with my part as with any of the others. Acting does not run in the males of my family. My son had a similar experience at his school. As soon as the producer heard his voice he said "The Ghost"; and my son's "swear" came through the boards as from a sepulchre.

• • •

We have now taken up the study of graphology. Recently we attended a convention across the water, and, as is the usual custom there, we were given a label on which to write our name and affix to our lapel. Since we spent a major part of our time gazing shifty-eyed, to the strain of our superior oblique, or bent kyphotic-style, at lapels, or trying to ignore the inevitable nystagmoid glares of our colleagues, we were later given to reflect on the graphological clues supplied by the wearers of the name tags.

Broadly speaking (or rather reading), the writing and the amount written seemed to vary with the academic stature and the confidence of the owner. Perhaps what caught our eye first was the clarity or obscurity of the writing, which could be in either script or print. Sometimes we found ourselves staring myopically at what at first glance seemed to be Arabic. At other times a parkinsonian-like script seemed to shrink before our very eyes, in contrast to the more expansive paretic-like scrawl.

Those very confident of being recognised seemed to use the surname only. BLODTZ proclaimed the bold proud letters. Lower down the scale we found ELMER S. BLODTZ; lower still, ELMER S. BLODTZ, M.D., asserted himself, and for the least secure the name bled forth in red. Alas, however, with the increase in mechanisation, we understand that they type the labels now.

We, on this side of the Atlantic, seem to approach things at a more genteel level. A modest SMITHERS, J., seems to suffice (to say nothing of those who decline to wear them at all); and we have noted that, at a recent international conference here, participants wore a carnation to which the label was attached. We enjoyed the guise of sampling the scent while sneaking a surreptitious peep at the tag. (As Goldsmith might have said—those who came to sniff remained to pry.)

Somehow, we don't really remember seeing any faces at all.

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WELTSCHMERZ

Each time that I have shoes to mend
The cobbler shoves his calloused thumb upon
The upper next the sole and squints
And says: "I'm sorry, Sir, the welt has gone."
Old friends, old comrades of the road,
Who trod the purpled hills from Dee to Don,
I love your polished wrinkles still,
Can it be true our welt has gone?
Or has the Minister of Shoes
Propounded rules all shoe repairers con?
"Don't say 'worn out', it sounds so rude—
The expert view is that the welt has gone."
Old shoes, old man, we're getting on
And that is why our welt has gone.

Letters to the Editor

SEPARATISM OR REINTEGRATION?

SIR,—All pathologists will be grateful to you for publishing Dr. McMenemey's [1] presidential address and your leading article,[2] just when we are so seriously considering the formation of a college. But many of us are convinced that, regrettable though it may be, a College of Pathologists is now a necessity.

As Dr. McMenemey said, the two chief aims of a college would be the running of a higher examination (and therefore the effective control of training) and the enfranchisement of pathologists. Like many of my colleagues I spent two frustrating years working for my Membership while training in a laboratory. At the end of it I had four more letters, a smattering of physical signs and pharmaceutics, and a far lesser knowledge than I should have had of my proper subject. The Membership is an admirable examination for selecting future physicians; but it is not satisfactory for selecting pathologists, and no amount of tinkering will make it so. Your suggestion that pathologists should be allowed a lower pass-mark in the clinical subjects is unworthy of you. Anyone prepared to read medicine so as to do rather badly in an ill-designed examination is unfitted to be a consultant in any subject. The examination must be properly designed, and candidates must be required to reach a high standard in all its parts.

It is this that makes enfranchisement so difficult. If the College of Physicians is to speak for pathologists, then we must be adequately represented on its comitia. But the Membership examination is now an essential prelude to election to the comitia. If therefore a different examination were devised as an essential step for pathologists, we should, unless the physicians recognised it as an entrance examination and not just a diploma, soon cease to be represented at all.

Furthermore, the comitia is a self-electing body. If the college organised, or recognised, a separate entrance examination for pathologists, our interests would be much more closely linked with it than at present; and we should need to have at least a gentleman's agreement that the fellows would elect a reasonable proportion of pathologists. Now I believe, and I think most pathologists believe, that the college as a whole takes the narrow view of the word "physician" which you deplore. If this is so, it is most unlikely that we should be accepted on the terms I have outlined, or that if we were the partnership would be a happy one.

Dr. McMenemey's assertion that the Association of Clinical Pathologists is an adequate representative body cannot be accepted. The association, largely through Dr. McMenemey's own labours, has worked wonders for pathology and pathologists, but it is still, unfortunately, by no means all-embracing. Many pathologists, especially in academic circles, have preferred to remain outside it, and it still speaks mainly for those in the National Health Service. Furthermore, it cannot run a higher examination, and it seems desirable that examination and representation should be functions of the same body.

As Dr. McMenemey points out, the scientific, administrative, and professional problems of pathologists are in many ways different from those of their colleagues; and one of their most important duties is the integration of their work with that of all other specialties. This inte-

1. *Lancet*, Oct. 18, 1958, p. 841.
2. *ibid.* p. 835.

grative activity is something far beyond that demanded of any other specialty, and it would therefore be illogical for us to be associated with only one college. Surely the obvious and best way of resolving all these factors is to have a self-governing organisation which has formal connections with other medical colleges and faculties. This is really not so different from what you yourself advocated for the general practitioners in 1951.[3]

At present pathology is neither clearly separated nor fully integrated. It could so easily be both.

J. A. U. MORGAN
German Hospital, London, E.8. Consultant Pathologist.

SICKLING AND SICKLE-CELL ANÆMIA

SIR,—While we are in full agreement with Dr. Shapiro (Nov. 1) that false sickling should not be confused with true sickling in surveys, we cannot agree that "failure to recognise these forms . . . has undoubtedly been responsible for such fantastically high sickling rates as 46% reported among pygmoids in East Africa . . ."

Dr. Shapiro quotes our report on the Baamba pygmoids in 1949,[4] when we found 45% of sicklers among 140 subjects; but since then there have been two other surveys of the Baamba. Allison [5] in 1954 found an incidence of 39·1% among 220, and we ourselves [6] in 1956 one of 37% in 478 subjects. Calculation of χ^2 showed that each of these surveys might, with a probability of more than 0·1, have been drawn from populations of identical sickling-rate. In the last survey mentioned the presence of hæmoglobin-S was confirmed electrophoretically in all the samples accepted as positive for sickling microscopically. Amongst the Baamba, at least, the reported incidence of sickling cannot be explained by the inclusion of false positive results.

May we take this opportunity to correct another statement which recently appeared in your columns?

Dr. Went and Dr. MacIver (Oct. 18) write that "Lehmann and Raper (1956) were inclined to doubt the existence of homozygous sickle-cell anæmia in adults in Africa". Although in the article to which they refer [6] we do state that we found no sickle-cell homozygotes amongst 478 Baamba over the age of 5, and conclude that the survival of sickle-cell homozygotes plays no significant part in the maintenance of the high sickling frequency in that tribe, we make it quite clear that our conclusion applies only to this isolated primitive community, and we state elsewhere in the same paper that "in Uganda we have observed adolescents and young adults suffering from sickle-cell anæmia of no great severity, in whose cases hæmatological, chemical, and genetic studies were consistent with the view that they were homozygotes".

St. Bartholomew's Hospital, London, E.C.1. H. LEHMANN.
Bristol Royal Infirmary, Bristol, 2. A. B. RAPER.

S.H.M.O. POSTS IN PSYCHIATRY

SIR,—Glancing longingly through some of the senior vacancies in psychiatry advertised in a recent issue of *The Lancet*, I came across the following:

"Candidates for these S.H.M.O. posts should normally hold a D.P.M. but applications will also be considered from candidates without previous experience in psychiatry who hold a higher qualification and have had a wide experience in general medicine in the senior-registrar grade, and who intend to obtain a D.P.M. and specialise in psychiatry."

What a splendid offer! Higher qualification (unspecified), *no* experience, and one need only *intend* to take a D.P.M.

Having pushed my spinning eyes back into their sockets, I avidly scanned the rest of the page for the advertisement for a consultant's post, which I felt sure must be there: "... a higher qualification and a little psychiatric experience would be an advantage ..." Thank goodness I was disappointed!

A statement like this leads one to believe that psychiatry must be in a poor way indeed.

The person who would apply for such position would be one who intended originally to be a specialist in some other branch of medicine, and who had got stuck at the senior-registrar level. In other words, someone who would be taking up psychiatry as a second choice of career. This state of affairs does not engender a healthy attitude towards any specialty and least of all towards psychiatry. It would require a complete reorientation of outlook, and someone trained for so long in general-hospital methods would find it extremely difficult and, I feel, not a little frustrating. Such a person would, presumably, be expected to earn his keep by taking the responsibilities associated with his grade. He would be expected to stand in for the consultant. He would be expected to advise the senior registrars and registrars, many of whom already hold a D.P.M. and have considerable experience in the specialty. A wholly unsatisfactory position.

There must be something basically wrong with the psychiatric set-up in an area when it cannot attract experienced psychiatrists to its senior posts. The advertisement also shows a marked disregard for the feelings of the S.H.M.O.s already in the area, for it implies that their jobs can be taken over, quite adequately, by someone completely lacking in previous experience.

If higher qualifications are essential for the running of a psychiatric service then surely it would be better if the S.H.M.O.s and senior registrars already experienced in psychiatry were given the opportunity and the time to study for these higher qualifications. I am sure there would then be no lack of suitably experienced psychiatrists applying for posts in the area.

Wakefield. DOUGLAS A. KNOX.

NOVOBIOCIN AND TETRACYCLINE IN CHRONIC BRONCHITIS

SIR,—The report by Dr. Buchanan and his colleagues (Oct. 4) provides good evidence that the long-term administration of tetracycline reduces the number of exacerbations of pulmonary infection in chronic bronchitics. This form of treatment does, however, have certain disadvantages, not the least of which is the expense involved. If only for this reason, many practitioners prefer to treat exacerbations of chronic bronchitis as they arise. Even a short course of treatment with broad-spectrum antibiotics is expensive and the possibility of using smaller doses without significantly decreasing the effectiveness is of obvious interest.

It has been suggested that a combination of novobiocin and tetracycline demonstrates synergism.[1] This, however, has been denied by others [2] who prefer to regard any potentiation as being additive and suggest that greater antibacterial activity against sensitive organisms is derived from a combination of these antibiotics than from either alone. It also appears that novobiocin maintains an effective concentration in circulating serum for up to 12 hours after oral administration.[3]

Because of these suggestions an attempt was made (as a pilot survey) to assess the effect of smaller doses of these antibiotics in the treatment of exacerbations of chronic bronchitis. Sixty patients who were known chronic bronchitics took part in the trial, following admission to hospital with an exacerbation of their disease. They were divided into two groups and treated with tablets each containing 125 mg. of novobiocin calcium and 125 mg. of tetracycline hydrochloride ('Albamycin-T').

3. *ibid.* 1951, ii, 1071; 1952, i, 139.
4. Lehmann, H., Raper, A. B. *Nature, Lond.* 1949, **164**, 494.
5. Allison, A. C. *Trans. R. Soc. trop. Med. Hyg.* 1954, **48**, 312.
6. Lehmann, H., Raper, A. B. *Brit. med. J.* 1956, ii, 333.

1. Wallick, H., Harris, D. A., Reagan, M. A., Ruger, M., Woodruff, H. B. *Antibiot. Ann.* 1955–56, p. 909.
2. Elliott, H. E., Hall, W. H. *ibid.* 1956–57, p. 596.
3. Wright, W. W., Putnam, L. E., Welch, H. *Antibiot. Med.* 1956, **2**, 311.

Group A had two tablets (i.e., 250 mg. each of novobiocin and tetracycline) every 6 hours for 5–9 days.

Group B had two tablets on admission and thereafter one tablet (i.e., 125 mg. each of novobiocin and tetracycline) every 12 hours for 5–9 days.

The results were:

	Group A	*Group B*
Satisfactory response within 3 days: antibiotics stopped after 5 days	19	20
Satisfactory response within 5 days: antibiotics stopped after 9 days	4	4
Satisfactory response but recurrence within one month *	2	2
No response	7	2

* These recurrences were again given similar treatment. One patient died, one failed to respond and then made a good recovery on chloramphenicol, and the other two made a good recovery without changing treatment and had no further recurrence during the next month.

Of the nine patients who failed to respond to treatment three died and the other six responded to different antibiotics. The two patients in group B who failed to respond were not affected by increasing the dosage of the same antibiotics. Twenty-three patients on the larger dosage and twenty-four on the smaller dosage responded well to treatment, suggesting that the smaller dosage was adequate.

It must be stressed that this trial was not "blind" and the more seriously ill patients tended to be placed in the group receiving the higher dosage of antibiotics. All the patients received supplementary treatment with bronchodilator drugs, physiotherapy, and steam inhalations.

These results suggest that treatment of exacerbations of chronic bronchitis with smaller dosages of the combination of antibiotics described can be effective in many cases.

I wish to thank Dr. F. Roles and Dr. J. Bruce Young for allowing me to treat their patients and Dr. A. R. H. Hicks, of Upjohn of England, Ltd., for his assistance and a generous supply of 'Albamycin-T' tablets.

London, N.6. O. DE S. PINTO.

REACTION TIME IN MYXŒDEMA

SIR,—I have read with great interest Dr. Murray's paper of Aug. 23. He determines the changes in reaction time with the help of a rather complicated apparatus which, I am sure, does provide useful information in the diagnosis and treatment of myxœdema. However, I feel that similar satisfactory results may be obtained by a much simpler test method. If a myxœdematous patient is asked alternately to turn his hands up and down in rapid succession, he is unable to do so, but rather performs the movements slowly and haltingly, in the same manner as a patient with a cerebellar lesion. I therefore termed this procedure the "adiadochokinesis test" of myxœdema.[1] As the patient's clinical state improves, the movements become more rapid, and finally return to normal.

May I relate another "test", which I learnt from a patient of mine and which I found both amusing and instructive?

A very learned rabbi, who for decades on the Jewish feast of Purin (which celebrates the deliverance of the Jewish community in Persia at the time of King Ahasuerus) used to read the book of Esther (in Hebrew, the Megillath Esther) to his congregation, came to me with the complaint that this year it had taken him more than 2 hours instead of his usual 40 minutes to do the recital. This man was found to have severe myxœdema and was given thyroid. As a therapeutic guide I decided to use the "Megillath Esther test"; I asked my patient to read the book of Esther aloud every few days and to note down the time required to do so. Both the treatment and the test worked beautifully. There was, along with clinical amelioriation, a progressive acceleration of the reading time, until the patient became euthyroid and the "test" was back at normal ranges.

I realise, of course, that the Megillath Esther test cannot be generally used. On the other hand, it may be easily modified according to race, creed, and nationality, and the underlying principle of the reading of a well-known script may indeed serve as a means of determining the changes in reaction time and thus in cerebral function in myxœdematous patients.

Jerusalem, Israel. HERMAN ZONDEK.

SIGHT TESTING

SIR,—In the recent B.B.C. television documentary, *On Call to a Nation*, a doctor was represented as saying to a patient, "All you need is to take this (form) to a sight-testing optician". Section 41 of the National Health Service Act, 1946, gives freedom of choice to the patient to have his sight tested either by an ophthalmic medical practitioner or by an ophthalmic optician in the Supplementary Ophthalmic Service. It is deplorable that a doctor should be represented as virtually directing a patient to a non-medical sight-tester.

Liverpool. JOHN MATTHEWS.

THYMECTOMY AND MYASTHENIA GRAVIS

SIR,—Dr. Laurent (Sept. 27) puts forward a very interesting and valuable suggestion which could open a new approach to this problem:

"Can it be that myasthenia gravis is *a label covering a number of disorders* of the myoneural junction? . . . Is it not, a priori, likely that the myoneural junction . . . can be impeded in *more ways than we know*?" (italics mine).

Or, for that matter, the trouble could lie in the muscle structure proper.

Evidence is gathering about the successful use of cortisone in myasthenia gravis. In 1952–53 I was studying the effect of steroids on the polymerisation of actin (the active protein of muscle contraction) and with others [1 2] found that cortisone, as much as the various digitalis glycosides, increases this polymerisation. In the language of physiology this means that the steroids enhance the relaxation and possibly the contraction [3] of the striated and cardiac musculature.

In 1953, on the basis of these findings, I put forward the hypothesis that steroids act as enzymes in the contraction and relaxation of muscle,[3 4] and I tentatively marked out their place in the bioenergy cycle of contraction (and relaxation).[5] Szent-Györgyi, although he holds different views, admitted that this hypothesis could be correct,[6] while Santiago Grisolia, using different methods and a different approach, came, in 1957, to the same conclusion as I did.[7] He also found a tentative place for his cardioglycosides (steroids) in the contraction cycle which was basically in agreement with my "placing".

On these grounds one may suggest that myasthenia gravis is (also) a problem of bioenergetics and might usefully be studied as such. I hope that these remarks may be a constructive comment on Dr. Laurent's original proposition.

West London Hospital Medical School, Hammersmith. S. ZADOR.

1. Zondek, H., Leszynsky, H. E., Zondek, G. W. *Acta endocr., Copenhagen*, 1955, **18**, 117.

1. Cowle, J. B., Thorpe, R. H. *Nature, Lond.* 1953, **171**, 1067.
2. Horvath, I., Kiraly, C., Szerb, J. *ibid.* 1949, **164**, 4175.
3. Zador, S. *Jap. J. pharmacol.* 1956, **6**, 11.
4. Zador, S. Private communication with Prof. C. Rymington, London (1953).
5. Zador, S. *Lancet*, 1957, ii, 1288.
6. Zador, S. Private communication with Prof. A. Szent-Györgyi, Woodshole, Mass., U.S.A. (1954).
7. Grisolia, S. Digitalis (edited by E. Grey Diamond); p. 86. Springfield, Ill., 1957.

EARLIER DETECTION OF LUNG CANCER

SIR,—I read with interest Dr. Nash's letter of Oct. 4. It is to be hoped that photofluorography and "live" multi-angle inspection by image intensifier of the hilar and perihilar areas will give us more information. Indeed, it is hoped that other procedures will also be developed to facilitate earlier diagnosis. Information in this field, however, should not only aim at diagnosis but should also give some indication regarding operability.

Unfortunately X-ray pictures do not, so far, give us all this information, and the other existing diagnostic procedures suffer from the same shortcoming. All contribute their share in diagnosis and evaluation, but in most cases the final word still rests with exploratory thoracotomy.

Surgical exploration of the chest is an established procedure, but recently some surgeons have come to wonder whether exploratory thoracotomy is not prejudicial to survival if the operation proves fruitless. At least one author [1] has found that patients with inoperable carcinoma of the lung undergoing exploratory thoracotomy have a shorter survival period than patients whose inoperability is decided by non-surgical clinical methods.

This has not been our experience. Recently Ross and I [2] reviewed 122 inoperable cases seen at Roswell Park Memorial Cancer Institute of New York over a 7-year period. Survival-rates of all cases of carcinoma of the lung demonstrated as being inoperable on exploratory thoracotomy were compared with those where inoperability was determined by clinical methods. Survival-rates were identical (a mean of 25 weeks in each group) and there was no evidence that by fruitless thoracotomy life expectancy had in any way been shortened. Indeed exploration often reveals some cases previously believed inoperable to be resectable.

As exploratory thoracotomy seems, so far, to be the only sure method of determining resectability, it is my feeling that, unless definite signs of metastases are present, the patient should be given the benefit of doubt and undergo surgical exploration.

Glace Bay, Nova Scotia. S. W. A. GUNN.

BANTING UP TO DATE

SIR,—To argue, as Dr. Mackarness appears to do in his letter of Oct. 18, that because Eskimos eat much fat, all can safely do so, is to promote a dangerous fallacy. Mankind in the polar regions is indeed a great meat-eater, and a great fat-eater, too. But at the equator he is the opposite, being largely a plant-eater. Each type has been evolved to eat the food of his natural environment, just as his skin varies in colour to cope with the sunlight present. Neither type, from an evolutionary point of view, should eat the food of the other.

In these islands we have descendants from northern and southern invaders, and individuals not only vary enormously in complexion, but also in their natural food habits. And some of them are Jack Sprats, whilst some are the opposite. To force any of them to eat more fat than they desire is to break every evolutionary law. This is always a dangerous thing to do, and it is not necessary to argue about the particularly unpleasant danger involved here.

The approach to the problem of obesity indicated by natural laws is based not on a distortion of the natural food-pattern of the individual but on the ruthless restoration of foods—especially carbohydrates—to their natural, unconcentrated state, as suggested in my letter of Oct. 25. For example, as a start in the right direction, we can restore the 5 ounces of sugar consumed each day by the average adult to the 3 lb. of beetroot from which it has been derived, or to, say, 6-7 lb. of apples, and then see how many excess calories are taken in this way.

Gosport, Hampshire. T. L. CLEAVE.

TWO GROUPS OF IMBECILE CHILDREN

SIR,—The absence of any recognisable physical anomaly in the majority of feebleminded persons, coupled with a frequent history of adverse home conditions, has sometimes been taken as an indication that environment directly contributes to low intellectual performance. This hypothesis has been supported by such work as that of Clarke and Clarke [1] who demonstrated that removal from a very bad home to an institution resulted in subsequent gains in the intelligence quotient (I.Q.). We have made a preliminary study to determine whether adverse home conditions were commoner in imbecile children in whom no physical anomalies could be established than in those with definite physical symptoms.

All those children in Botleys Park Hospital with I.Q.s between 30 and 50 and ages 9–15, who attended the occupation-centre school, could speak, had no gross sensory or motor handicaps, and did not suffer from severe psychotic disturbances, were included in the sample. This selection probably accounted for the high proportion without physical anomalies. Dr. G. Dutton, then senior registrar at the hospital, found that 25 of the 40 in the sample had either mongolism, epilepsy, and neurological, endocrine, or skeletal anomalies In the remaining 15 no such conditions had been observed.

The children with physical anomalies (the "clinical group") and the remainder (the "residual group") were compared on the following items: age, age at admission, degree of excitability, number of defective parents and sibs, and the presence or absence of adverse home conditions.

To assess excitability, items relating to emotional level, aggressive behaviour, and sociability were taken from Claridge's and O'Connor's scale.[2] Rating was carried out on a weighted 4-point scale, by the head teacher of the institution school who was in daily contact with the children.

For assessment of home conditions the procedure and criteria used by Clarke and Clarke [1] with feebleminded patients were adapted. One of us, who had no knowledge of clinical diagnosis, rated the 40 case-histories for the absence or presence of:

1. Alleged parental cruelty and bullying.
2. Illegitimacy or divorce resulting in lack of a stable home.
3. One or both parents reported to be incompetent, illiterate and of subnormal intelligence.
4. History of crime in parents or child resulting in court recommendation for removal from home.
5. Home conditions reported to be bad or unsuitable for care of child.
6. Child reported to have been considerably neglected and undernourished.
7. Home reported to be dirty and neglected or grossly overcrowded and poor.
8. Child had been abandoned.

The presence of two or more of these criteria in any one case was taken as evidence of a bad home. If the child had been abandoned by his family, and consequently no other information was available, this in itself was considered sufficient reason to list the home as a bad one. In addition, brief summaries of the 40 case-papers were assessed by a psychiatric social worker and the home conditions noted. The social worker had no knowledge either of the children or of their diagnoses. Her judgment agreed with our classification in 37 of the 40 cases. In the remaining 3 our rating was accepted.

1. Bishop, C. A. *J. thorac. Surg.* 1957, **33**, 330.
2. *Bull. Roswell Park Mem. Inst., N.Y.* 1957, **2**, 171.

1. Clarke, A. D. B., Clarke, A. M. *Brit. J. Psychol.* 1954, **45**, 3.
2. Claridge, G. S., O'Connor, N. *J. ment. Def. Res.* 1957, **1**, 16.

The groups did not differ significantly in present age, in age at admission, in the number of defective parents or sibs recorded, or in excitability score. A significant difference between the clinical and residual groups was found in the proportion of children who had come from adverse homes. 3 of the 25 in the clinical group and 9 of the 15 in the residual group were so rated. χ^2 on this item is 12·7, P=0·001. Controlling for intelligence level, using 11 patients from each group matched for I.Q., and recalculating differences in frequency of bad home conditions reduces χ^2 to 9·6, P=0·01.

As our sample was not a random one, no conclusions can be drawn which apply to the imbecile population as a whole. On the other hand, through limiting the heterogeneity of our sample, we have controlled for variables such as sharp differences in grade of defect, difference in the amount and extent of nursing care required, and variables such as gross motor disability and sight, hearing and speech defects, which in a more random sample might have led to admission to hospital.

Our results may be partly due to sampling. The physically normal imbecile child might be kept at home if home conditions are good, but admitted to an institution if they are bad. The epileptic or mongol child with abnormal appearance or behaviour manifestation of similar intellectual level might come into the hóspital regardless of home conditions. Our conclusion would then go no further than the statement that physically normal imbecile children from bad homes are found more frequently in an institutional population than the same type of child with a satisfactory home background. To check this, the study would have to be repeated with imbecile children living at home. From a recent survey it seems, however, that social conditions in families with imbecile children at home do not differ from those of families with children in institutions. Clarke and Clarke tell us that they have noted imbecile patients with adverse social histories who showed substantial I.Q. gains in late adolescence, bringing them into the higher feebleminded range. Such observations support the hypothesis that the residual group includes imbecile children for whose intellectual deficiency social conditions might be partly responsible.

Medical Research Council,
Social Psychiatry Research Unit,
Institute of Psychiatry.

B. HERMELIN.
E. KIRWAN.

EXERCISE-TOLERANCE TESTS

SIR,—I read with interest the paper by Dr. E. A. Harris in your issue of Aug. 23, and agree that it is important to have a simple objective method of evaluating cardiac tolerance to exercise. The Master two-step test is, I believe, the most reliable currently used.

Dr. Harris described only the old Master exercise test of 1929 and 1935, and stated that the Master exercise test "depends entirely on a single pulse-count taken sitting 2 minutes after standard exercise". I should like to add that since 1941 we have employed the electrocardiogram after exercise in our study of cardiac function, not the pulse and blood-pressure. On this subject we have published many papers since 1935, the last one in 1957. In view of the fact that the Master test, as employed in the past 17 years, is not the "Master test" as described by Dr. Harris, there seems little point in refuting his comments, but rather to present a summary of our experience.

The "two-step" test is standardised. The trips on the published tables depend on sex, age, and weight. Lead II and leads V_{2-6} are employed immediately, two minutes, and six minutes after the effort, but the control 12-lead electrocardiogram done just before the test must be normal.

The chief criterion of an abnormal response is a horizontal or sag-like depression of the RS–T segment. It appears that a mere "J" or junctional depression is of less importance, or has no significance at all.

The test should not be performed if the patient is acutely ill. The procedure must be stopped at the very first appearance of any chest pain or discomfort.

Unlike other cardiac-function tests, the double two-step test (three minutes) is indeed of value if it is negative. In the vast majority of cases (more than 95%) a normal test excludes any interference with the coronary circulation at the time of testing and a search should be made for extracardiac causes of the patient's chest pain or pressure.

In the presence of active coronary-artery disease, or in any type of heart-disease which limits the function of the heart, the test is positive in the vast majority of cases.

In normal people the test is negative in all but 1–2% of the cases, provided one takes into consideration the shape of the RS–T segment depression.

New York. ARTHUR M. MASTER.

ALCOHOLISM A DISEASE AND A CHALLENGE

SIR,—Your issue of Oct. 25 contains an announcement of a conference on this subject held by the Temperance Council of the Christian Churches. That alcoholism presents a challenge, in regard to research as well as to treatment, is illustrated elsewhere in the same issue, in discussions on pathogenesis and treatment of delirium tremens (p. 892) and on the difference in incidence of alcoholism among the various social classes (p. 888).

As to the problem of precipitation of delirium tremens, the long-debated question of the existence of an "abstinence delirium" is (according to Henderson and Gillespie's *Textbook of Psychiatry*) not yet settled, some authors regarding abstinence as merely the first evidence of the developing psychosis, the nausea responsible for the cessation of drinking as a premonitory symptom. In P. H. Hoch's view [1] "the stress situation . . . placed on the Nervous System in producing (delirium tremens) could be abstinence in some individuals, but in most individuals it has nothing to do with the withdrawal of alcohol". W.H.O. expert committees think the term "abstinence syndrome" "justified in the case of drug addiction of the morphine type", but not in connection with alcohol where they recommend the use of the term "withdrawal symptoms" only,[2] the latter being described [3] (chiefly on the basis of findings with volunteers at Lexington [4]) as including in some drinkers convulsions or delirium tremens following "cessation of drinking or even . . . an abrupt decrease in the rate of intake" after a prolonged very heavy drinking bout. This corresponds to experience at Warlingham Park Hospital where in several alcoholic patients convulsions and more rarely delirium tremens were seen within a few days of admission, and it is difficult to avoid the conclusion that in these cases delirium was precipitated by withdrawal of alcohol.

As to treatment (which aims at correction of dehydration and malnutrition as well as at sedation), magnesium and promazine are only two out of a number of drugs put forward in recent years as a significant advance. Thus, injection of an insulin-glucose-vitamin mixture,[5] of very large doses of several vitamins,[6] of corticotrophin,[7 8] and now the tranquillisers have all been described as very helpful—and some of them as sometimes even life-saving [8 9] in delirium tremens. Reports of

1. *In* Alcoholism as a Medical Problem (edited by H. D. Kruse); p. 65. New York, 1956.
2. *Wld Hlth Org. tech. Rep. Ser.* 1954, **84**, 438.
3. *ibid.* 1955, **94**, 6.
4. Isbell, H., Fraser, H. F., Wikler, A., Belleville, R. E., Eisenman, A. J. *Quart. J. Stud. Alc.* 1955, **16**, 1.
5. Pullar-Strecker, H. *Brit. J. Addict.* 1954, **51**, 36.
6. Gould, J. *ibid.* p. 29.
7. Alcoholism (edited by G. N. Thompson); pp. 269, 481. Springfield, Ill., 1956.
8. Feldman, D. J., Zucker, H. D. *J. Amer. med. Ass.* 1953, **153**, 859.
9. Murray, N., Swegan, W. *Quart. J. Stud. Alc.* 1958, **19**, 509.

excellent results with tranquillisers not only in the treatment but also in the prevention of delirium tremens have been published in countries where the condition is relatively common, such as the United States and France,[10] some authors describing their effects as "far superior to conventional sedatives".[11] However Laties et al.,[12] report that "many (American) clinics now consider chlorpromazine the drug of choice in managing agitated alcoholics suffering from D.T." and "stress the lack of properly controlled experiments demonstrating the superiority of chlorpromazine over paraldehyde, the barbiturates and other sedatives".

Whether paraldehyde is at present still the most widely used drug, as stated in your annotation, seems doubtful, but it may be of some interest to report that, in an admittedly very small series at Warlingham Park, intramuscular paraldehyde was sometimes rapidly effective, where intravenous injections of tranquillisers and corticotrophin, and high doses of vitamins had failed. However, the oral route is probably best avoided with paraldehyde and the barbiturates in alcoholics, in whom these drugs often rapidly lead to habit formation and sometimes addiction (though there will have to be "tapering off" of barbiturates in the frequent cases of a combination of alcoholism and habitual barbiturate overdosage). As evident from several American reports (concerning meprobamate [13 14]) the risk of habit formation to tranquillisers supervening in alcoholics cannot be excluded.

The association between alcoholism and liver cirrhosis is referred to in your annotation as "common" (though much less than that between alcoholism and the [reversible] fatty infiltration of the liver [8]) and provides the basis for the frequently quoted estimate of the number of 86,000 chronic alcoholics in this country.[15] How near this estimate comes to the real figure is unknown, as is the relative prevalence of alcoholism among the various social classes. Most alcoholics admitted to mental hospitals in this country for alcoholism and alcoholic psychosis come from social classes I and II,[16] whereas your review of Professor Hollingshead and Dr. Redlich's book (Oct. 25, p. 888) quotes an increased incidence of alcoholic psychosis lower in the social scale. However, alcoholism among lower social classes may not be uncommon in this country either, a few smaller studies showing a preponderance of classes V and IV among alcoholics living in a London reception centre and of class III in a London observation ward.[17] There may be some similarity here to the American finding quoted in your review that "disturbed people in classes I and II are induced to seek help by "gentle and insightful means", whereas in classes IV and V the means are authoritative, compulsory . . .". Possibly the much greater representation of classes I and II among alcoholics asking for admission to hospitals or joining Alcoholics Anonymous is at least partly due to their greater understanding of the need and possibility of treatment, and the greater insight among their families or employers, whereas the concept of the alcoholic as a sick man who could and should be helped seems as yet much less known or accepted by the other social classes.

There are, of course, many other unanswered questions in the complex field of alcoholism requiring research and attention. The need for information is illustrated by recent conferences on alcoholism, convened by societies such as the Royal Medico-Psychological Association and the Institute for the Study and Treatment of Delinquency, as well as the Temperance Council, and the regular discussions of the Society for the Study of Addiction. It is, however, difficult to see a good reason why such work should be left entirely to the initiative of a few private organisations and not be primarily the responsibility of the whole community and the National Health Service.

St. Bernard's Hospital, Middlesex. M. M. GLATT.

10. *Encéphale*, 1956, **45**, 736, 739, 744, 1219.
11. Godfrey, L., Kiffer, M. D., Downs, T. M. *Quart. J. Stud. Alc.* 1958, **19**, 118.
12. Laties, V. G., Lassagna, A. L., Gross, G. M., Hitchman, J. L., Flores, J. *ibid.* p. 238.
13. Lemere, F. *Arch. Neurol. Psychiat.* 1956, **76**, 205.
14. Haizlip, T. M., Ewing, J. A. *New Engl. J. Med.* 1958, **258**, 1181.
15. *Wld Hlth Org. tech. Rep. Ser.* 1951, **42**, 20.
16. Registrar General's Statistical Review of England and Wales for the Two Years 1950-51: Supplement on General Morbidity, Cancer, and Mental Health; p. 167. H.M. Stationery Office, 1955.
17. Glatt, M. M. *Brit. med. J.* 1955, ii 1029.

ON THE ENVELOPE

SIR,—Last week my post included an advertisement which bore on the envelope the words Longer Life for Hypertensives.

Like many families mine includes someone whose blood-pressure is moderately raised. This intelligent and easily anxious lady learned eighteen months ago that she was suffering from hypertension. Had she seen this slogan all our encouragement that her life is not in danger might have been wasted. Many patients with high blood-pressure are aware of it, and the word "hypertension," like other medical jargon, is becoming more widely understood.

This seems to me to be an example of an advertiser forgetting his responsibilities. No doubt it is galling to know that most of the expensive literature they send goes into the wastepaper-basket unread, but drug manufacturers will realise that catch-phrases on envelopes are public and are almost bound to be misinterpreted.

London, S.W.19. G. DUBOULAY.

CARCINOMA OF THE CERVIX

SIR,—Dr. H. W. Ashworth's congratulatory remarks on our article of Oct. 25 (Cytological Screening of 1000 Women for Cervical Cancer) are much appreciated. He raises, however, the most perplexing problem, of how far one can practise preventive medicine.

It is obviously impossible to take smears from the whole female population between the age-groups discussed, but this is no reason why those who come to the doctor should not be screened in this way. Let me assure him that those who took part in Professor Kellar's investigation are continuing to take cervical smears. The value of this is borne out by our experience.

My partners and I had 11 positive reports out of 590 women screened. We had, during the same time, 4 women with clinical cervical carcinoma. Of these 4, 2 are dead and a 3rd is ill with extensive metastases. The prospects of survival of those 11 detected by cytology is surely far more hopeful, to say the least.

By the practitioners who joined Professor Kellar's research project, the Ayre spatula is now accepted as an essential instrument of general practice. Whenever it is necessary to look at the cervix it is equally necessary to take a cervical smear. Of course without the wholehearted support and work of Dr. A. F. Anderson and his team the taking of smears would be valueless.

Dr. Ashworth's second and third questions on wider routine examination must be answered in the affirmative, if we are to do more than pay lip service to preventive medicine. Admittedly the word preventive is not used here in its proper sense, the various disease processes having already started when detected; but by "early" detection we do prevent the appearance of the inoperable or poor-risk case.

The development of new techniques for such detection will no doubt mean special efforts and harder work for those who place preventive work on the same level of importance as curative work. But overwork is largely a question of perspective, and adequate organisation may help here. Perhaps the Family Doctor Centre planned in Edinburgh by the Nuffield Trust and the Department of

Health may give us the answer later. Meanwhile we shall continue to search for the early case as far as our resources permit.

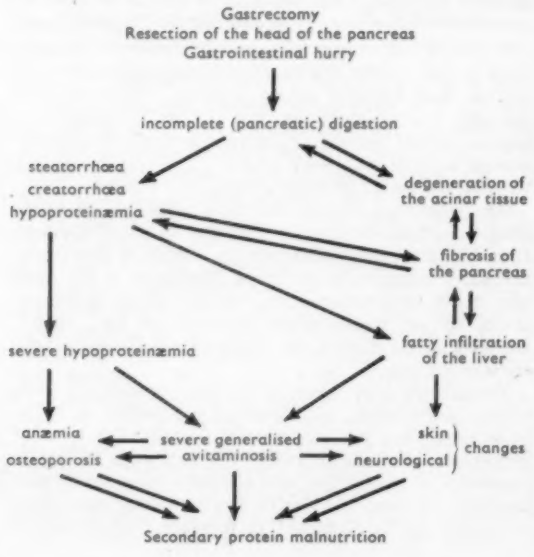
E. V. KUENSSBERG
Chairman Research Committee,
South-East Scotland Faculty,
College of General Practitioners.
Edinburgh.

PROTEIN MALNUTRITION AND THE PANCREAS

SIR,—I am indebted to Dr. Shaper (Oct. 4) for his interesting letter. I quite agree with him that the name kwashiorkor—if used at all—should preferably be reserved for the disease affecting quickly growing children fed on a diet abnormally low in protein. But I cannot follow his argument when he says that the term secondary protein malnutrition syndrome should not be used for post-operative conditions which are not primarily associated with a dietary deficiency of protein, no matter what their clinical appearance. It appeared useful to classify all deficiency states as primary or secondary; in this way the unity of the syndrome remained safeguarded no matter what its ætiology, although with the increasing recognition and elucidation of such deficiency states the ætiology became naturally more and more manifold.

Dr. Shaper repeatedly reaffirms that protein malnutrition plays an undoubted and significant role in initiating pancreatic lesions. Indeed, a considerable part of the discussion in my paper was devoted to marshalling the clinical and experimental evidence to prove this. But it appears far-fetched to say that in a pre-existing proven chronic pancreatitis protein malnutrition *could not* increase the fibrosis. The ætiology and nature of chronic pancreatitis is little understood, but the hypertrophy of islet tissue with complete absence of acinar cells and gross fibrosis (case 1) is suggestive rather of protein malnutrition and not of common chronic pancreatitis. As to no evidence for pancreatic lesion in the second case: pancreatic biopsy is as yet not a routine diagnostic method, but surely the finding of undigested muscle fibres and fat globules in the fæces for several years, in spite of massive doses of pancreatin, the intolerable abdominal distention at times and irradiating pain into the left shoulder and axilla, do certainly not indicate an intact pancreas.

The accompanying diagram attempts to illustrate the possible mechanism of malabsorption leading to secondary protein malnutrition. It shows that the simultaneous combination of several factors is needed for the production of the state of fully developed secondary protein malnutrition, and also that the process may remain stationary at different stages, which incidentally might be the reason that no similar cases were published so far.



London, W.1. Z. A. LEITNER.

HOSPITAL BEDDING

SIR,—Mr. Bayes' letter of Oct. 25 is a helpful explanation of the terms used in the weaving industry for the different materials now being tried as hospital blankets.

I confirm his remark that the material my colleagues and I inadequately described as "loomstate cotton weave" was cellular-woven loomstate cotton. We think that hospital users will understand this description better than the technically correct "leno loomstate cotton". This material makes excellent blankets.

The other material we used was, as Mr. Bayes states, bleached terry (or turkish) towelling. Mr. Bayes states that we found this a poor heat insulator. We did, in fact, report it as an admirable material for this purpose. Its insulation value has since been measured and is slightly greater than that of a woollen blanket. Patients using it confirm this.

Public Health Laboratory,
General Hospital, Middlesbrough. R. BLOWERS.

ORAL TREATMENT OF PERNICIOUS ANÆMIA

SIR,—If Dr. Herbert and his colleagues (Oct. 11) really believe that results similar to ours can be obtained by using crystalline vitamin B_{12} alone, they should certainly endeavour to obtain them, for if they succeed, they will have achieved far more than any of the authors whom they quote in support of their statement that "small oral amounts of vitamin B_{12}, from 5 μg. to 100 μg. daily, will often produce remission in patients with pernicious anæmia in relapse".

We have already commented on their second reference [1] elsewhere.[2] With regard to the work of Hall,[3] the author's own conclusion is that "doses up to 100 times the minimal effective parenteral dose are variable and unpredictable". Glass et al.,[4] whose paper is also quoted, used doses of crystalline vitamin B_{12} ranging from 10 μg. to 30 μg. per day on eight cases for periods up to 18 days only, and obtained a slight improvement in one case, and reticulocytosis without hæmatological improvement in two further cases. These authors similarly state that "If B_{12} was given by mouth in doses even 50 to 100 times greater than those ordinarily used for parenteral administration the hæmopoietic response was irregular and for the most part unsatisfactory".

Chalmers and Hall [5] succeeded in maintaining one case for 18 months on 50 μg. per day, and a further seven cases for a fortnight on similar doses, but themselves attributed the results to the "strict precautions taken to ensure that the patients took the dose when fasting and had no food for six hours afterwards". Ungley,[6] whom they also quote, found that 5 μg. daily was ineffective, but that 80 μg. per day had a slight effect in one case. He calculated that this latter patient, who received the higher dose for 24 days, produced no greater response than would have been expected in 15 days from a single injection of 2·5 μg. of vitamin B_{12}!

It is the interpretation of the sole remaining reference by Dr. Herbert and his colleagues, however, which puzzles us most of all. They state that eleven consecutive patients in one study [7] "received 5–15 μg. of vitamin B_{12} by mouth daily for five months; there was an almost regular occurrence of remission, with three of the patients showing a maximal response".

1. Estren, S., Wasserman, L. R. *Proc. Soc. exp. Biol., N.Y.* 1956, **91**, 499.
2. Heathcote, J. G., Mooney, F. S. *J. Pharm., Lond.* 1958, **10**, 593.
3. Hall, B. E. *Brit. med. J.* 1950, ii, 385.
4. Glass, G. B. J., Boyd, L. J., Rubinstein, M. A., Svigals, C. S. *Science*, 1952, **115**, 101.
5. Chalmers, J. N. M., Hall, Z. M. *Brit. med. J.* 1954, i, 1179.
6. Ungley, C. C. *ibid.* 1950, ii, 905.
7. Glass, G. B. J., Boyd, L. J. *Blood*, 1953, **8**, 867.

Unless our eyes deceive us, however, this work is actually a report of 20 cases of pernicious anæmia, of whom only one responded to vitamin B_{12} alone. This patient received 15 μg. per day for two weeks and gave a slight blood response in the first week which was not maintained in the second. No clinical improvement was observed. In fact the authors state in their discussion of the results that daily oral doses of vitamin B_{12} should be not less than 15 μg. even "*when given orally in conjunction with intrinsic factor concentrate*".

Dr. Herbert and his colleagues may disagree with our conclusion, but surely they do not believe that any of this published work to which they refer really compares with ours, in which five consecutive cases have been maintained in full health for over five hundred days on a daily vitamin-B_{12} intake of less than 15 μg.

Finally, in taking us to task for our lack of controls, they appear to have missed the point of our work. We are not primarily interested in initial responses, as we have said in the past. There is no lack of information on that subject, as the references in their own letter show. We are more interested in the ability of our preparations to restore to health patients suffering from pernicious anæmia, and to maintain them in that condition for an indefinite period. Had our aims been otherwise, we certainly should not have chosen to give initial dosage equivalents of vitamin B_{12} which, even if given orally as crystalline cyanocobalamin, might, in a few cases, be capable of producing some sort of initial response. Such a response can be obtained from a variety of preparations, but a completely successful oral preparation must do far more than this. It must maintain patients in health indefinitely, and refractoriness must not develop.

Our aim, we repeat, is to test our preparations on a long-term basis, and the emphasis in our work is on "maintenance" rather than on "initial response". It should be clear, therefore, that a control to this type of indefinitely prolonged investigation is not only superfluous but, strictly speaking, quite impossible.

St. Helens Hospital,
St. Helens, Lancs.

F. S. MOONEY
J. G. HEATHCOTE.

A POSSIBLE MODE OF ACTION OF INTRINSIC FACTOR

SIR,—The discussion between Dr. Heathcote and Dr. Mooney [1 2] and Dr. Latner [3] on the mode of action of the intrinsic factor induces me to cite certain experiments on this subject carried out before 1939.[4 5]

500 g. of meat was extracted with 70% alcohol, and the alcohol was removed afterwards by distillation. This meat extract was mixed with 50 ml. of neutralised human gastric juice (either after incubation at 37°C for 4 hours or without incubation), and when administered daily it caused a definite remission in pernicious anæmia. Meat extract alone had no effect.

When the meat extract was dialysed through a collodion membrane and then mixed with gastric juice it also controlled pernicious anæmia. This suggests that the extrinsic factor present in the meat extract could pass through a collodion filter.

If the action of the intrinsic factor on the extrinsic factor consists of proteolysis or other type of splitting of a larger molecule into a smaller one, resulting in the active principle in pernicious anæmia, this active principle would also have to be dialysable. This was tested in the next experiment.

Meat extract and human gastric juice were incubated at 37°C for 4 hours. The incubated mixture was then dialysed and administered to a patient with pernicious anæmia without effect. Later a smaller amount of meat extract and gastric juice caused a remission. Thus a dialysable active principle cannot be demonstrated after incubation, and the experiment provides evidence against all theories based on an enzymatic splitting activity of the intrinsic factor.

Other experiments on these extracts suggested that no other in-vitro action of the intrinsic factor on the extrinsic factor takes place.

Department of General Pathology,
University of Amsterdam.

P. FORMIJNE.

1. Heathcote, J. G., Mooney, F. S. *Lancet*, 1958, i, 982.
2. Heathcote, J. G., Mooney, F. S. *ibid.* p. 1177.
3. Latner, A. L. *ibid.* p. 1077.
4. Formijne, P. *Arch. intern. Med.* 1940, **66**, 1191.
5. Formijne, P. *Chem. Weekbl.* 1940, **37**, 171.

METALDEHYDE POISONING

SIR,—The following case is recorded as a slight contribution to the subject of man-made self-intoxication. It tells of a child who nearly died from ingesting metaldehyde ('Slogan') which had been applied to keep snails away from strawberries.

Most reported cases of metaldehyde poisoning have been either accidental ingestion of 'Meta' (dry alcohol) tablets by children, or suicidal attempts with these tablets. Meta is produced in Switzerland, and these cases have been reported in the *Schweizerische Medizinische Wochenschrift*.[1 2]

A girl aged 3½ had been in perfect health until 5.30 P.M. on March 2, 1958. Returning home after playing outdoors she had a sudden pain in her arms, and this was followed in a few minutes by nausea, intense retching, and repeated vomiting. Respiratory distress and cyanosis followed. At this stage she was seen by a doctor.

Her extremities went into cramp-like flexion and became very cold. She lost consciousness and the pupils narrowed and did not react to light: the muscles became completely flaccid and she went into deep shock. The blood-pressure could not be recorded. Pulse-rate was 120 per min.

The child was admitted to Bikkur Holim Hospital as a case of acute poisoning of unknown origin. She was still vomiting mucus and perspiring. Her skin was pale and reddish blue, as in paralysis of the peripheral circulation. Reflexes were normal with some hyperreflexia.

Treatment consisted of gastric lavage and colonic irrigation, oxygen and a caffeine-glucose infusion, and later 150 ml. of plasma intravenously. Her legs were warmed by a light box. Penicillin, streptomycin, and 0·4 mg. atropine were given to combat aspiration pneumonia and to counter the muscarine-like symptoms.

Later in the evening the blood-pressure rose to 170/90 mm. Hg, and temperature to 105·6°F (40·9°C). Vomiting continued. At night she passed some loose stools containing pseudomembranous casts and mucus.

Next morning she was in agitated coma. The conjunctivæ were injected, and pupils still contracted and not reacting to light. There was some fibrillary twitching of muscles. The eyegrounds were normal. By now the fever had subsided. The systolic blood-pressure was 150. While she was delirious she talked about thirst, and when she became conscious this was her first complaint. Within a further forty-eight hours she recovered completely, apart from amnesia covering the period of the illness and some time before it.

There seemed to be two possibilities—a scorpion sting or poisoning by ingestion. No sign of a scorpion sting was discovered. Mushroom or other plant poisoning was excluded: no poisonous mushrooms or plants were found by a botanist who searched the field in which the child had played before the accident. The vomited matter contained some undigested strawberries. The child is very keen on strawberries, and she may have eaten unwashed strawberries from the refrigerator.

Dr. W. Hirsch, a nutrition chemist, found traces of aldehyde in the vomited matter. Later he examined strawberries from the farm which produced the suspected strawberries, and found metaldehyde. The farmer had used slogan, a metaldehyde preparation, to protect his

1. Vischer, A. *Schweiz. med. Wschr.* 1935, **16**, 827.
2. Wolfer, P. *ibid.* 1927, **8**, 1144.

strawberries from snails. Prof. F. Eichholtz, of Heidelberg, took the view that this was metaldehyde poisoning.

It would be interesting to know whether any of your readers know of similar cases.

Our thanks are due to Mrs. Helena Kagan, chief of the pædiatric department, Bikkur Holim Hospital, to her nursing staff, and to the other colleagues who helped us in these inquiries.

ADOLF SPIGHEL
Jerusalem. MICHAEL ALROY-SPIGHEL.

CHILDREN IN HOSPITAL

SIR,—In his letter of Oct. 25 Mr. Herzog says of my film *A Two-year-old Goes to Hospital* that it "was made to convey a message; in real life one meets such extreme reaction very rarely".

In fact this film was shot with every precaution we could devise to ensure an unprejudiced account of the run-of-the-mill behaviour of very young children in hospital. The child was selected at random from a hospital waiting-list, and filming was done to a schedule agreed beforehand with the ward staff. Two kinds of record were made:

(*a*) Main events such as admission procedures and parental visits were taken as they occurred and in documentary fashion.

(*b*) A daily "time sample" was taken—that is, sequences were filmed over the same period each day and at regular intervals determined by a clock which is frequently seen in the film and not to any preconceptions of my own.

No part of the record was rehearsed or enacted, and no special situations were created apart from the play period introduced into the daily time sample. The spoken commentary neither interprets nor draws conclusions: interpretation is left to the viewer.

When the film was shown to the pædiatric section of the Royal Society of Medicine in November, 1953, it seemed generally agreed that, whatever its implications, the behaviour shown was common. This was confirmed when it was shown to the Royal College of Nursing in March, 1954.

Tavistock Child Development
Research Unit,
London, W.1. JAMES ROBERTSON.

LOCAL-AUTHORITY CLINICS

SIR,—Enthusiasts tend to overstate their case. Dr. Franklin (Nov. 1) is an enthusiast, like one or two of his colleagues who appeared in *On Call to a Nation*.

Many of us in the public-health service would agree that ultimately we must look to the family doctor, fully trained in preventive medicine and working in group-practice units from purpose-built premises, to render a truly comprehensive health service to his patients.[1] Indeed, pioneer schemes in which health visitors and midwives are attached to group practices have been in existence for some time.[2] But how many practitioners could provide a comprehensive service *now*? How many of them are sufficiently orientated in preventive techniques? Dr. Franklin must appreciate from his personal experience that such a service can only be provided satisfactorily from reasonably sized units of general practice [3]—yet at present one-third of the principals in the N.H.S. still work single-handed and rather less than one-third in units of three or more.[4]

If child-welfare clinics were to cease functioning tomorrow they would leave a gap which no-one else could fill for many years to come. Moreover, their description as a "historical hangover" completely ignores recent trends in the maternity and child-welfare service, such as increasing attention to problems of mental health [5] and to early ascertainment of serious handicaps for which new techniques are constantly being developed.[1]

These are some of the points which the public-health doctors in *On Call to a Nation* might have made, if they had had an opportunity to reply to the unbalanced comments made by a minority of general practitioners taking part in the programme. However, let me commend with you the masterly way in which Mr. Richard Cawston, the producer, welded the isolated statements of a large number of N.H.S. doctors with widely varying views into a composite whole.

London, E.C.1. WILFRID G. HARDING.

CHORIONCARCINOMA: AN IMMUNOLOGICAL APPROACH

SIR,—Congratulations on the interesting and provocative annotation in your issue of Sept. 27. So many inferences are drawn from a single case that I am tempted to follow the example.

A white-skinned Iraki, aged 36 years, married and with two children, was referred to me in Baghdad on Nov. 22, 1957. He complained of a right-sided upper abdominal tumour, first noted ten weeks previously and since then increasing in size. He had also noted considerable increase in size of both breasts and had in fact well-developed gynæcomastia.

The tumour itself occupied the right hypochondrium, was roughly 8 in. in diameter, with a suggestion of lobulation along its vertebral border. It was elastic and could not be clearly demarcated from the liver. Obviously it was mainly retroperitoneal since the right kidney was displaced upwards and its ureter deviated in a long curve lying in the flank.

A careful search was made for a primary tumour. The left testis was vestigial and the body of the right normal in size, shape, and consistence. At least that was the first impression, which was only dispelled on further repeated and careful examinations. Ultimately a small tumour was located in the body of the right testis producing a slight bulge of the tunica albuginea. Using two animals the Friedman pregnancy test was strongly positive, so a provisional diagnosis of chorioncarcinoma was made.

When it was explained that removal of the primary tumour was sometimes followed by recession of the secondaries the patient agreed to orchidectomy. The specimen showed what might pass as a normal testis except for the slight bulge which had previously been felt. There was no perforation into the tunica vaginalis. Section showed a pale-yellow well-circumscribed tumour the size of a marble and of much the same consistence as the surrounding testis. There was no sign of extension along the cord or the vas. Dr. Yussuf Akrawi reported "carcinoma simplex", but at the request of myself and my colleague, Dr. Khalid Naji, a further search was made and revealed syncytium. As early as two days after operation there was indisputable evidence of regression of the abdominal tumour and curiously enough the urine became solid with albumen. Improvement was maintained for about a week and during this time the breasts receded and the Friedman test became negative. This was followed by rapid enlargement of the tumour thought to be from degeneration and hæmorrhage. A few days later the patient died suddenly in the night. Death was due to a massive intraperitoneal hæmorrhage from an unsuspected metastasis on the under surface of the liver. From the naked-eye appearance alone there was no possible doubt about the nature of the tumour.

Perhaps we had anticipated your annotation by making a special request for an attempt to sex the tumour cells. Dr. Akrawi reported: "Histopathological examination shows a

1. Harding, W. G. The Matrix of Medicine; p. 36. London, 1958.
2. Chalke, H. D., Fisher, M. *Lancet*, 1957, ii, 685.
3. Franklin, L. M., Paulett, J. D., Tepper, R., Tuckman, E. *ibid.* 1951, i, 1226.
4. Report of the Ministry of Health, 1957; part I, p. 60.
5. *Med. Offr*, 1954, **92** 303.

chorionic epithelioma. Special staining showed nuclear elements suggestive of feminine origin."

It is difficult to imagine how the wife's genes could have played any part in the immunology of this particular case. Chorioma is a comparatively rare tumour but there is much evidence to suggest an immune reaction to many very common tumours. Consider how often an eye is removed for melanoma and it may be anything up to twenty years before metastases appear in the liver or elsewhere. What about the histologically proven malignant melanomast on the skin of children and their spontaneous disappearance? Local recurrences and metastases after radical mastectomy may be delayed for up to thirty years or more and when multiple they all seem to appear at the same time. Surely this must signify a breakdown in immunity or, less likely, a sudden upset of hormone balance?

But let us refer to some experimental work by Murray on tar tumours in mice.[1] His findings were:

(1) Tar tumours could not be induced in mice already suffering from spontaneous cancer of the breast (repetition of this experiment under admittedly different conditions failed to confirm this finding [2]).

(2) When two widely separated tar tumours were induced together they grew pari passu, with first one and then the other taking the lead.

(3) When two areas were tarred but at an interval of some weeks, a tumour would be established in the first and with only signs of proliferation in the second. Excision of no. 1 was followed by disappearance of no. 2. In another similar instance excision of no. 1 halted the growth of no. 2 for a period of twelve weeks, when activity was resumed.

(4) Attempts to incite a second tar cancer in the presence of one already established failed.

Murray stated, "The rarity of multiple malignant new growths in the same individual finds a rational explanation by it. Its greatest interest and importance, however, lies in the indication it gives of a systemic constitutional change in the organism in which cancer has developed . . ."

Undoubtedly there are many loopholes in any theory based on Murray's observations, but one of the most pleasurable mental exercises is to conceive a theory and try to fit the facts into place ignoring those which may be inconvenient. What then is the present state of knowledge of the behaviour of cancer in man?

(1) After operation cancer cells may lie dormant in the tissues for up to thirty years or more and then suddenly resume activity.

(2) Personal experience suggests that a new primary cannot arise in the presence of metastasis or recurrence of a first growth. Therefore the only evidence of cure lies in the appearance of another primary, as sometimes happens.

(3) Multiple primaries are rare and when encountered are roughly at the same stage of advancement and of about the same size. The colon presents many examples of this.

(4) It must be admitted that surgery is not the answer to cancer, but it is worth trying to make an evaluation in another way as a reinforcement to the peace of mind of the surgeon. Let 100 represent the total amount of cancer present in the body in any one case. It would seem to be indisputable that the removal of $x\%$ would enable the body to destroy or keep the remainder in check. The efficiency of the defensive mechanism can be expressed as $(100-x)$; but up to now the value of x still remains unknown and certainly varies from case to case.

However shaky this thesis may be, it has long endured as a salve to my not too elastic surgical conscience.

Newcastle upon Tyne. W. E. M. WARDILL.

1. Murray, J. A. Scientific Report of the Imperial Cancer Research Fund, 1923, viii, p. 75.
2. Murray, J. A. Scientific Report of the Imperial Cancer Research Fund, 1930, ix, p. 83.

THE CARDIORESPIRATORY SYNDROME OF EXTREME OBESITY

SIR,—I feel that Dr. Berlyne (Nov. 1) is perhaps a little hasty in rejecting the name Pickwickian for the syndrome of alveolar hypoventilation with obesity. That it refers to Joe, the fat boy, and not Mr. Pickwick is evident; otherwise it would be "the Pickwick syndrome". Pickwickian must refer to those in contact with the illustrious man, or a way of life in sympathy with that of Mr. Pickwick. Was it not Mr. Blotton, early in the book, who said he used a word in its Pickwickian sense?

The immortal Fat Boy must certainly be classed as Pickwickian and his claim to being the prototype of the patients described by Dr. Berlyne remains valid. I quote from the article:

"The essential features of the syndrome are obesity, cyanosis . . . and polycythæmia; others such as somnolence . . . periodic respiration . . . are less constant." In our first meeting with Joe he is described as ". . . a fat and red faced boy, in a state of somnolency . . ." As to the fat boy's breathing, we are told on at least one occasion, "the boy sighed deeply . . ."

From this one gathers that Joe was obese, polycythæmic if not cyanosed, somnolent, and given to sighing respiration. These surely are the features enumerated by Dr. Berlyne in his description of the syndrome. There are other similarities. Like the patient, Joe enjoyed an enormous appetite and was not averse to taking a drink.

The characteristic somnolence is presumably caused by CO_2 narcosis. It is a pity that Dr. Berlyne does not record the arterial blood CO_2 tension in his interesting patient. Lastly, it would be valuable to know the resting minute ventilation in this case, as it should be very low despite the rapid breathing.

London, N.6. B. H. BASS.

"CLEAN" VERSUS CATHETER SPECIMENS OF URINE

SIR,—In your annotation of Sept. 6 upon the claim of Boshell and Sanford [1] that "clean" freshly voided specimens of urine compare favourably—in a bacteriological sense—with those obtained by catheter, you question "how such arrangements are appropriate in a busy outpatient clinic or hospital ward".

It may consequently interest you that the investigation described by these authors was performed 3 years ago in my unit, and Dr. P. J. Nel, of my staff, was able to give a preliminary communication on our results in 97 cases to the annual congress of Obstetricians and Gynæcologists of South Africa in 1956. These results, combined with our subsequent experience, with "clean" voided specimens of urine, permit me to make the following observations:

(1) The incidence of unnecessary catheterisation can be reduced among intelligent patients attending efficient units (in which the pressure of work is not excessive) by strict adherence to a routine designed to obtain "cleaner" voided specimens of urine.

(2) Trivial departures from adherence to the gymnastics required to obtain "cleaner" voided specimens lead to dramatic alteration in urinary constituents—particularly in the organismal composition of the urine already known to contain pus.

(3) If a diagnosis of pyuria is made following upon examination of an allegedly "clean" voided specimen of urine, subsequent bacteriological examination of a specimen obtained by catheter is still imperative if bacteriological accuracy is desired.

1. Boshell, V. R., Sanford, J. P. *Ann. intern. Med.* 1958, **48**, 1040.

Experience consequently lends support to your suggestions, Sir, and "cleaner" (as opposed to "clean") specimens of voided urine might have been a more accurate title to your editorial.

Department of Gynæcology and Obstetrics, University of Natal, Durban. DERK CRICHTON.

PLASMA-HYDROCORTISONE LEVELS DURING CORTISONE ADMINISTRATION

SIR,—The preliminary communication of Dr. Mills and Dr. Bartter in your issue of Nov. 1 is, as they point out, of considerable interest to those who study the effects of cortisone upon rheumatoid arthritis. They observed a slow rise in the excretion of certain steroid metabolites following daily intramuscular injections of cortisone acetate and thought the rise due to a gradual increase in the rate of metabolism of the steroid.

We have studied the output of steroid metabolites after a single injection of cortisone acetate on a number of occasions and have come to the conclusion that there are two phases.

The first is a rapid absorption and excretion of part of the dose followed by a slow excretion of the remainder over many days. This latter may be due to the retention of some of the crystals in phagocytic cells since if the steroid is given in a water-soluble form (as sodium succinate) most of the metabolites are excreted within 24 hours. We have found that when therapeutic doses of prednisolone acetate are given for a prolonged period by intramuscular injection the excretion of metabolites slowly rises to a steady level which is the same as that found following similar doses of prednisolone given orally. The recovery of metabolites from orally administered cortisone acetate, given to rheumatoid arthritics, is the same at the beginning of treatment as it is after 1 year.

The fall in the level of plasma-cortisol that they also ascribe to a change in metabolism only occurred in two of their four patients and may have been due to other factors. If their assumptions were correct one would expect to observe a fall in the half-life of administered cortisol after prolonged therapy. Peterson et al.[1] found no change in the half-life of cortisol after prolonged therapy.

Dr. Mills and Dr. Bartter, in their discussion, refer to their work on the protein-binding of steroids. It is from this sort of study that we may expect further information on the subject of the adaptation to cortisone and cortisone analogues that occurs during the treatment of rheumatoid arthritis. The concentrations of physiologically active hormones in the plasma that are *not* protein-bound determine the concentrations available to the tissues. Now that there is little doubt that steroids (with their specific dehydrogenases) operate as co-enzymes (i.e., catalysts)[2] it is the measurement of such concentrations that must engage us rather than the study of metabolites and of the combined levels of free and protein-bound hormones that have filled our horizons so far.

Nether Edge Hospital, Sheffield. H. F. WEST.

RECTAL EXAMINATION

SIR,—Unlike Molière's Monsieur Jourdain, who was astonished that he had been speaking prose all his life, I am surprised that the finger-cot technique that I have used for many years, and that is described by Mr. Lees Ferguson (Oct. 25), is anything but prosaic. Remaining hazards are old finger-cots and long fingernails. Is it too much to hope that the disreputable and disgusting practice of using a rubber glove or a finger-stall with a cape like a French policeman's, both of which are reversed on removal and, who knows, uncertainly de-reversed and inadequately sterilised before re-use, will be finally discarded?

London, W.1. S. CHARLES LEWSEN.

J.H. STRAIN OF A NEW RESPIRATORY VIRUS

SIR,—Last week's report by Dr. Tyrrell and Dr. Bynoe suggests intriguing possibilities regarding some respiratory viruses in man.

Both the J.H. virus and the 2060 virus have been isolated infrequently and with great difficulty in monkey-kidney cultures. Accordingly it has been necessary to depend on increments of neutralising antibody as an indication of infection. These determinations have presented many problems because of the slightness of cytopathogenic effects in positive cultures, the lack of sharp end-points, and the variation in absolute titres between replicate determinations. Fortunately a clear increase in neutralising-antibody titres of paired sera has proved reproducible in cultures in which virus growth is adequate.

It is difficult to compare our results with those reported by Tyrrell and Bynoe since our virus-serum mixture is held at 4°C for 30 minutes before inoculation of cultures, whereas they changed fluids 24 hours after inoculation. We have found that a fluid change during neutralisation of influenza B in monkey-kidney cultures allows growth of virus; the neutralisation titre is lower than that obtained without a fluid change.

Measurement of antibody with 2060 virus may have increased the incidence of positive reactors in their studies, since it is conceivable that antibody response could depend on previous experience as well as on the immediate antigen. Possibly the lack of correlation in men between infections and absence of significant amounts of virus-neutralising antibody is due to virus being present in less than an infecting dose. Certainly one would expect more multiplication and probably more clinical illness with virus that had retained its human adaptation. It is also understandable that virus could be readily isolated after one passage in man of virus adapted to monkey-kidney culture. But serial passage in volunteers might have resulted in loss of adaptation, with difficulty in monkey-kidney culture.

Tulane University Medical School, New Orleans, Louisiana, U.S.A. WILLIAM J. MOGABGAB
WILLIAM PELON.

PEROXIDASE STAINING IN LEUCOCYTES

SIR,—The risk of carcinogenesis associated with the manufacture and use of benzidine has led to its replacement as a laboratory reagent by alternative substances, such as *o*-tolidine, whenever possible. Earlier this year a modification of Washburn's staining technique for peroxidase, using *o*-tolidine, was reported in your pages.[1]

Using the Graham-Knoll peroxidase technique[2] and replacing benzidine with *o*-tolidine, we have obtained results which, when compared with the specimens obtained with the original method, were extremely satisfactory and showed an even more brilliant staining pattern.

The technique is as follows:

(1) Slides are fixed for 30 seconds in a solution of 10 ml. of 40% formalin and 90 ml. of ethanol, washed with tap water, and air dried.

(2) In a measuring cylinder 250 mg. of *o*-tolidine is dissolved in 6 ml. of ethanol and the solution is diluted with 4 ml. of distilled water. 0·02 ml. of hydrogen peroxide (20 vol.) is added. No filtration is necessary because *o*-tolidine does not cause any heavy precipitation.

(3) The solution is applied for 7 minutes.

Department of Medicine, University of Cambridge, Cambridge. DENNIS QUAGLINO
ROGER FLEMANS.

1. Peterson, R. E., Wyngaarden, J. B., Guerra, S. L., Brodie, B. B., Bunim, J. J. *J. clin. Invest.* 1955, **34**, 1779.
2. Hurlock, B., Talalay, P. *J. biol. Chem.* 1958, **233**, 886.

1. Jacobs, A. *Lancet*, 1958, i, 697.
2. Undritz, E. *Verh. Schweiz. Naturf. Ges.* 1941, **121**, 200.

Parliament

Points from the Debate on the Queen's Speech

IN opening the second day's debate on the Speech from the Throne, Mr. JAMES GRIFFITHS said that the proposed reorganisation of the mental health services would place new duties on the local authorities. He believed that they were competent to do this work but that they could not carry out their new responsibilities without adequate funds. He asked for full details about the financial implications of the new block grant. Later in the debate Mr. ARTHUR BLENKINSOP returned to this point and reminded members that the Royal Commission had made it clear that their recommendations for community care could not be effectively carried out unless the local authorities were given additional funds. In his view the Government had gone out of their way to make things difficult for the local authorities by their decisions about the block grant.

The local authorities were also anxious to extend their welfare services for old people. At present there was an Exchequer grant of up to 50% for approved expenditure on these services. The Government's proposal of an overall block grant would mean that health would have to fight for its place with everything else and with no guarantee to encourage local authorities to take a progressive attitude.

Mr. GORDON WALKER was also dissatisfied with the progress of our social services, and he firmly attributed the increase in crime not to the Welfare State but to the failure of the Welfare State. All the evidence showed that there was a correlation between crime and poor conditions and poor education. Mr. R. A. BUTLER, the Home Secretary, said that while he would not agree that the development of crime was entirely due to the Welfare State he thought that in a society such as ours, which had greatly increased social security, it was with horror that we realised that crime had not been banished by increased prosperity nor had moral progress been ensured by the achievement of material satisfaction. A society's laws should encourage and protect virtue, but a moral basis of conduct could no more be imparted by the Government than could a religious belief. The roots of crime lay deep in society and the sources from which they were nourished were almost wholly beyond the Government's reach and could not be dealt with by the Government alone. They must enlist the cooperation of the House of Commons, of the country, of the family, of the churches, and of the schools.

Mr. KENNETH ROBINSON turned from crime in general to a specific crime which in his view should not be a crime at all—attempted suicide. The present legal attitude to suicide and attempted suicide was a hangover from the past and in some ways symbolised what we thought about human frailty and about mental illness, for people who tried to commit suicide were almost all mentally ill. To drag them before the courts and perhaps give them a prison sentence seemed to him the most ludicrous way of dealing with any form of ill health.

Prescribed Diseases

On Oct. 29 Mr. R. E. PRENTICE moved the annulment of the recent regulations amending the schedule of prescribed diseases under the National Insurance (Industrial Injuries) Act.[1] He admitted that he did so, not because he disapproved of the proposed changes, but because he thought that they did not go far enough in the schedule. Mr. Prentice particularly regretted that the groups of people covered for tuberculosis had been restricted and would no longer include those working with animal remains. Dr. DICKSON MABON carried this point further and urged that the veterinary surgeon and those employed in slaughter houses might also be exposed to infection and were entitled to protection. He also thought it wrong to withhold protection from social workers who were not doctors or nurses.

Mr. W. M. F. VANE, joint parliamentary secretary to the Ministry of Pensions and National Insurance, said that the expert committee which in 1949 recommended the inclusion of tuberculosis in the schedule had in mind only tuberculosis from human contact. Owing to the imprecise drafting of the original regulations a very few claims had been accepted from people working with animal remains. He thought it unfair to other workers that these rare claims should be accepted by infiltration and not because the merits of the occupation were considered by experts to justify it. The Minister had been advised that there was no justification for extending the limited provision for workers in the field of human contacts because there was no comparable risk and because the incidence of tuberculosis was contracting rapidly in this country.

1. S.I. 1958, no. 1068.

Leprosy in the United Kingdom

There are 266 known cases of leprosy in the United Kingdom at the present time.

Obituary

DAVID IVOR JONES DAVIES

C.B.E., M.D. Lond., F.R.C.P.

Dr. Ivor Davies, consulting physician to the Cardiff Royal Infirmary, died at Aberystwyth on Oct. 30 at the age of 78.

He started his medical education at University College, Cardiff, and completed the clinical part of the course in London at St. Bartholomew's Hospital. After qualifying in 1906 he held house-posts at Barts, the Royal Free Hospital, and The Hospital for Sick Children, Great Ormond Street. In 1911 he obtained the degree of M.D. and the M.R.C.P. and settled in consultant practice in Cardiff. After holding an appointment as clinical assistant in charge of outpatients at King Edward's Hospital, he joined the staff of the Royal Infirmary and of the local Ministry of Pensions hospital. He took a prominent part in the rescue work after the Senghenydd mining disaster in 1913, and he made a special study of the occupational diseases and disabilities of coalmining.

Though he retired from the Cardiff Royal Infirmary in 1942, before the start of the National Health Service, he readily undertook duties for the Welsh Regional Hospital Board, and in the early days, before the specialist service was fully recruited, he was invaluable. Even after his retirement to Aberystwyth he came back on many occasions to fill gaps in the regional hospitals. Despite his seniority he did not think it too much trouble to attend to routine duties in several hospitals in West Wales. He enjoyed this work, and he was never happier than when dealing with patients to whom he could talk in their native Welsh. A fellow guest at the Harveian dinner of the Royal College of Physicians which he attended last month recalls his satisfaction at the amount of Welsh he had been able to speak since he retired and his pleasure in his friends' congratulations on his progress and fluency.

J. G., one of his Cardiff colleagues, writes:

" Ivor Davies was born and spent his early boyhood in the Rhondda Valley and he had a deep understanding of that craggy and courageous character, the Welsh miner, and was ever mindful of the stress and peril of his task. In the disastrous explosion at the Senghenydd Colliery he took an active part in rescue and resuscitation operations. During this hazardous work he made the astute clinical observation that some of the miners showed what appeared to be burns but that they had not been exposed to fire. Similar burn-like injuries have been noted in the Comet air disaster.

" He saw the beginning of the clinical school in Cardiff and was one of its first teachers, being attached to the medical unit. Through the ups and downs in the fortunes of its infancy, I. J. D., as he liked to be called, was always loyal to the school. A friend of the students, he was especially helpful during those trying days. If there was shortage of clinical material at the

teaching hospital, he would take his students to the poor-law and Ministry of Pensions hospitals, and it was pleasing to see large packets of cigarettes being surreptitiously slipped to patients there as a reward for their cooperation.

"His retirement was active, and he found time to pay a long visit to South Africa where his daughters are settled, returning to a country which he had first visited soon after the Boer War, on a trip round the world which also included Australia and New Zealand. He was an indefatigable writer and his memoirs were his main preoccupation during his last years. His large medical library included many books and papers of Osler, whom he knew well and admired. The Welsh National School library has received many of his more valuable volumes and a large number of his collection of autographed portraits. He was the gentlest of men, helpful and charitable to all."

Mr. Ivor Jones Davies is survived by his second wife, Dilys, daughter of John Evans.

ARTHUR MILLER

F.R.C.S.E., D.L.O.

Mr. Arthur Miller, who died suddenly on Oct. 11, was a widely known London otolaryngologist. He was on the staffs of the French and Italian Hospitals, in which he and his wife took great interest.

He served in the 1914–18 war in France with the British Red Cross and was awarded the Cross of the Legion of Honour by Marshal Foch in 1918. In the late war he worked at the Edgware General Hospital on the emergency surgical staff. He was awarded the Medaille de la Reconnaisance by the French President in 1944.

He was also consultant to the Ealing Borough and Middlesex County Council school clinics for the past twelve years and, as his colleagues, R. M. S. and McK. McC., recall, "he put much thought and time into his work there, where he is spoken of most highly.

"He will be honoured as a pioneer of the modern school ear clinics, which have done much to reduce the damage inflicted by otitis media and to give early treatment to deaf children. Arthur and Yvonne Miller were widely known in St. Moritz, among the skiers in the Engadine, to whose parties they added grace, charm, and friendliness."

W. M. writes:

"I have known Arthur Miller since I was a child, for he was my father's assistant before he entered consulting practice. Although he had appointments in various London hospitals, his chief interest lay in the foreign communities. He was well suited for this, for he spoke French without accent, and his wife was French. He was hardworking and he well deserved the respect his patients had for him. It was always a pleasure to see a patient with him, and to see the strict and rather formal code of behaviour which one associates with the older English generation, but which has its roots directly in the Latin tradition. Miller was noticeably unlike the ordinary London consultant, for he was clearly not English, and it is sad to think that there will be no-one like him again in otolaryngology."

DR. A. T. TODD

A FORMER associate writes: "As one who has worked many years with Dr. Todd, I should like to add a few words in his memory. He was a man of an extremely brusque exterior, belying his real kindly, thoughtful, and witty personality. He was a wide reader and led a secluded home life, fond of his garden and cats. In his work, he treated every case as a complete whole, both psychologically and clinically. The smallest detail of cooking in dietary or the personal comfort of the patient was of the greatest importance in his treatment. The survival for such long periods of many of his incurable cases was due to his ability to raise and sustain hope by some urge to live which he could pass on to his patient. He will be remembered by many of us for his individuality, his extreme conscientiousness, and the tenacity of purpose in his work."

Mr. HINTON ROBERTSON

An obituary of Mr. Robertson appeared on Oct. 18. I. W. MacPhee writes:

"Permit me to contribute to the memory of the man we all valued so much.

"It is given to very few men to bind to themselves beyond death an indissoluble loyalty. To all of us who served our old chief, Hinton Robertson, that loyalty, once given, will continue in our lifetime. Service to him was the greatest thing but one for me; yet he permitted neither service nor admiration. He was the complete man. Of all the men of his time, he was the wisest, the justest and best."

Diary of the Week

NOV. 9 TO 15

Monday, 10th

POSTGRADUATE MEDICAL SCHOOL, Ducane Road, W.12
4 P.M. Dr. Brian Ackner: Psychiatric Aspects of Organic Cerebral Disease.

INSTITUTE OF OBSTETRICS AND GYNÆCOLOGY
4.30 P.M. (Chelsea Hospital for Women, Dovehouse Street, S.W.3.) Miss Gladys Hill: Menorrhagia.

Tuesday, 11th

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
8 P.M. *Psychiatry*. Dr. Michael Shepherd, Dr. Michael Fisher, Dr. Lilli Stein, Dr. W. I. N. Kessel: Psychiatric Morbidity in an Urban Group Practice.

ST. MARY'S HOSPITAL MEDICAL SCHOOL, W.2
5 P.M. Dr. George Crosby: Gynæcology in General Practice.

INSTITUTE OF DERMATOLOGY, Lisle Street, W.C.2
5.30 P.M. Dr. P. F. Borrie: Circulatory and Vascular Reactions.

ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE, 28, Portland Place, W.1
4 P.M. Brigadier Sir John Boyd: Yellow Fever and its Prevention.

MANCHESTER MEDICAL SOCIETY
8 P.M. (Clinical Sciences Building, York Place.) *Surgery*. Dr. J. K. Steward: Tumours in Childhood.

UNIVERSITY OF ST. ANDREWS
5 P.M. (Physiology Department, The Medical School, Dundee.) Dr. H. D. Attwood: Investigation of Pulmonary Embolism.

Wednesday, 12th

ROYAL SOCIETY OF MEDICINE
4.30 P.M. *Physical Medicine*. Dr. Kenneth Lloyd: Hazards of Athletic Exercise. (Presidential address.)
8 P.M. *Proctology*. Mr. Denis Browne, Dr. L. Guttmann, Mr. G. M. Gwillim, Mr. Charles Heanley, Prof. J. Chassar Moir, Mr. Patrick Sames, Mr. Ian Todd: Rectal Continence.

POSTGRADUATE MEDICAL SCHOOL
2 P.M. Prof. C. H. Gray: Role of Endocrine Organs in Diabetes Mellitus.

INSTITUTE OF DERMATOLOGY
5.30 P.M. Dr. J. A. Dudgeon: Virus Diseases.

INSTITUTE OF DISEASES OF THE CHEST, Brompton, S.W.3
5 P.M. Dr. A. M. C. Macpherson: Some Chest Diseases in Childhood.

ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE
3.30 P.M. Mr. H. B. Wright: Environmental Medicine in Industry.

MANCHESTER MEDICAL SOCIETY
5 P.M. (Medical School, University of Manchester.) Dr. A. F. Rogers: A Doctor in Antarctica.

ROYAL FACULTY OF PHYSICIANS AND SURGEONS, 242, St. Vincent Street, Glasgow
5 P.M. Prof. D. W. Smithers: Pathogenesis of Cancer. (Weild lecture.)

Thursday, 13th

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn Fields, W.C.2
5 P.M. Mr. Norman Capener: Spondylolisthesis—Spinal Strain. (Robert Jones lecture.)

ROYAL SOCIETY OF MEDICINE
5 P.M. *Ophthalmology*. Dr. R. A. Weale, Dr. P. A. Merton, Dr. G. Melville-Jones: New Concepts of Eye Movement.

ROYAL MEDICO-PSYCHOLOGICAL ASSOCIATION
2.15 P.M. (1, Wimpole Street, W.1.) Dr. Leo Kanner (Baltimore): Trends in Child Psychiatry. (Maudsley lecture.)

HONYMAN GILLESPIE LECTURE
5 P.M. (University New Buildings, Teviot Place, Edinburgh.) Prof. G. I. Scott: The Optic Nerves.

UNIVERSITY OF ST. ANDREWS
5 P.M. (Physiology Department, Medical School, Dundee.) Prof. Hans Grüneberg: Causes of Congenital Defects.

Friday, 14th

ROYAL SOCIETY OF MEDICINE
5 P.M. *Clinical*. Mr. H. E. Hobbs: Unilateral Proptosis from Cavernous Orbital Hæmangioma—Diagnosis by Orbital Phlebography. Dr. B. Gottleib: Filariasis with Chyluria.

POSTGRADUATE MEDICAL SCHOOL
10 A.M. Prof. W. C. Wilson: Ins and Outs of Surgical Practice.
4 P.M. Prof. W. Melville Arnott: Regional Distribution of Blood Flow in Low Output Syndromes.

INSTITUTE OF LARYNGOLOGY AND OTOLOGY, 330, Gray's Inn Road, W.C.1
4.30 P.M. Mr. T. G. Wilson: Modern Treatment of Deafness in Historical Perspective.

PLYMOUTH MEDICAL SOCIETY
8.30 P.M. (Freedom Fields.) Mr. T. Holmes Sellors: Thoracic Surgery.

Notes and News

INSTITUTE OF ORTHOPÆDICS

NEW laboratories at the country section of the Institute of Orthopædics, at Stanmore, Middlesex, were opened by Sir Henry Dale on Oct. 31.

The laboratory building, which is H-shaped, has four divisions. The first of these, containing the department of biochemistry, was completed in 1952. Of the new divisions, one is for laboratory animals, another is devoted to clinical pathology and bacteriology, and the fourth is for clinical research. The cost of the building has been shared by the Wellcome Trust and the University of London.

NEW CHAIR OF PÆDIATRICS IN EAST AFRICA

A CORRESPONDENT writes: Among recent generous contributions made by the United Nations Children's Fund (UNICEF) for children's work in East Africa is a grant of $45,000 to enable the University College to create a professorship in pædiatrics and child health at Makerere College Medical School. This appointment would have been a normal development sometime in the next college quinquennium (1961–66) but could not be financed before then. The holder will be a full-time member of the college staff and will be physician in charge of the children's wards and clinics at Mulago Hospital. His task will be to develop the children's department as a centre of teaching and research and (in collaboration with the Government authorities and other bodies) to promote public interest in the care of children. It is hoped also to develop postgraduate medical training in pædiatrics and to give assistance in the training of nurses and health visitors.

The first holder of the chair will be Dr. D. B. Jelliffe, at present visiting professor of tropical medicine at Tulane University in the United States.

After qualifying from the Middlesex Hospital in 1943 and holding registrar appointments there, Professor Jelliffe was a medical inspector in the Sudan Medical Service, after which he held senior lectureships in pædiatrics at Ibadan (University College of Nigeria) and later at the University College of the West Indies. He was W.H.O. professor in pædiatrics at the All-India Institute of Hygiene and Public Health, Calcutta, before going to Tulane. He has published many papers in tropical pædiatrics and was himself editor of the *West African Medical Journal* and founder editor of the *Journal of Tropical Pædiatrics*.

It is appropriate that Professor Jelliffe's latest work is a book jointly edited by himself and Dr. H. C. Trowell, who has just retired after a long career in the Kenya and Uganda Medical Services, latterly as senior medical specialist, and lecturer in medicine and pædiatrics at Makerere. For it is largely Dr. Trowell's work in the past fifteen years at Mulago Hospital, and his teaching and research, that has led to consideration of a whole-time professorial appointment as becoming a practical proposition—indeed a necessity. The growth of the children's work at Mulago under his direction attracted the interest of the Hospital for Sick Children, Great Ormond Street, which now has a scheme for secondment of medical and nursing staff at Mulago, and it was the potentialities of this unit as a centre for teaching and research that determined UNICEF in their choice of Kampala as a suitable place to give their support.

In entering what is for them a new field in the promotion of teaching and research at university level, UNICEF have given a stimulus to this branch of medical study and practice, the benefits of which should be felt throughout East Africa.

ALARM IN LOS ANGELES

THE latest series of test explosions carried out by the United States Atomic Energy Commission in its Nevada proving-grounds ended last week. On Oct. 30 an underground explosion dislodged millions of tons of rock and sent up a large cloud of dust. Reports say [1] "there was a slight escape of radioactivity from the tunnel". Fear of danger from fallout was widespread in Los Angeles and elsewhere, and Mr. Alistair Cooke speaks of a "minor panic".[2] Measurements of radioactivity in the atmosphere over southern California indicated a level 20% above the accepted "safe" level. The mayor of Los Angeles telephoned to Washington asking for the cessation of tests in Nevada; and in fact no further explosions took place, though this may have been according to plan and not in response to the mayor's protest.

The U.S. Public Health Service said [2] that "on the basis of available information" there was no "immediate hazard or danger" in the sudden increase of radioactivity in Los Angeles; and the Atomic Energy Commission declared (apparently in an attempt to reassure) that the observed daily fallout of 1200 micromicrocuries was about equal to the exposure people would receive "under normal circumstances in two months". But Dr. Paul Saltman, professor of biochemistry in the University of Southern California, was less hopeful: "I would like to say something to relieve the public mind about the dangers of this high radioactivity level. But I can't say it. Radiation exposure is a cumulative thing. What happens today we always have with us."

The underground test was presumably concerned, in part at least, with the peaceful applications of such explosions. One possibility is that the heat generated and retained underground can be used as a source of power.

1. *Manchester Guardian*, Oct. 31.

A HOSPITAL EXHIBITION

EVERY year the Royal Northern Hospital, London, N.7, holds an exhibition illustrating work in progress. This year the eighteen sections covered many aspects of medicine, surgery, pathology, biochemistry, and radiology.

A demonstration of the use of infra-red photography in the early diagnosis of pregnancy was of particular interest. This technique shows up the increased vascularity of the breast as early as the second or third week of gestation, before other changes can be detected.

There was a useful account of inadvertent parathyroidectomy, and of how this danger may be avoided. Among the orthopædic exhibits was shown a method of bone-grafting using chips introduced with a gun which was devised at the hospital though now much more widely used.

"Robot" radiography is an advance in the technique of peripheral arteriography. In the presence of vascular disease the circulation-time varies considerably, but the film exposure can be accurately timed by adding radiosodium to the contrast medium and using a Geiger counter.

Intravenous radio-phosphorus has been used as a test of malignancy, and also as a guide to the progress of radiotherapy, because it is taken up in large amounts by malignant tissue but not by non-malignant tissue, and in decreasing amounts as a tumour is inactivated by irradiation.

Unusual pathological specimens included an example of almost complete thrombosis of the aorta, an epithelioma cuniculatum ("rabbit-warren"), a congenital intrapericardial cyst, and the rare genetically determined condition of osteogenesis imperfecta.

MEDICAL FILMS

ALTHOUGH embryology is considered particularly suitable for presentation in animated film—indeed it was one of the subjects on which films were desired by teachers of medicine in 1946 [3]—there are still very few films on the subject generally available in Great Britain. The advantage of the medium for this subject can be seen in *Rotation of the Gut* (16 mm., silent, black and white, 5 minutes, Netherlands, 1948).[4]

The film consists of a series of diagrams by Mrs. H. L. Blumenthal, which are animated to demonstrate the development from a single straight tube to the normal lie of the gastrointestinal tract with its mesentery. The sequence is shown three times, first as a continuous action, then with pauses at each stage so that the relative positions of each part can be studied, and finally as a continuous action again. The film should be valuable for both medical students and post-graduate students of surgery.

2. *ibid.* Nov. 1.
3. List of Subjects on which Films are Desired by Teachers of Medicine. London: Scientific Film Association. 1946.
4. Available on hire from Film Surveys Ltd., 54, Upper Montagu Street, London, W.1.

Royal College of Physicians of London

At a comitia on Oct. 30, with Dr. Robert Platt, the president, in the chair, it was announced that the Queen had most graciously accepted the invitation to become Visitor to the College. Dr. W. D. W. Brooks, Dr. M. I. A. Hunter, Dr. G. E. Godber, and Dr. W. H. McMenemey were elected councillors. Dr. C. E. Newman was elected representative on the committee of management. Dr. Platt, Sir Harold Boldero, Dr. R. R. Bomford, Dr. G. W. Hayward, and Dr. S. R. F. Whittaker were elected members of the standing joint committee of the three Royal Colleges. Dr. L. G. Norman has been appointed Milroy lecturer for 1960: his subject will be the medical aspects of the prevention of road accidents.

The Gilbert Blane medal was awarded to Surgeon Commander W. E. Crocker.

The following were admitted to the membership:

H. B. Anstall, M.B. Lond., Norma A. Beardwell, M.B. Lond., D. B. Bell, M.B. Leeds, Peter Blackledge, M.B. Lond., J. H. Briggs, M.B. Lond., W. C. Cockburn, M.B. Aberd., J. E. Cooper, B.M. Oxon., M. A. Cowan, M.B. Sheff., S. G. Elkington, M.B. Cantab., M. G. Gelder, B.M. Oxon., H. B. Griffith, B.M. Oxon., J. H. Highman, M.B. Lond., J. R. Hobbs, M.B. Lond., A. D. Isaacs, M.B. Lond., Yong Kiat Lee, M.B. Malaya, W. A. Lishman, M.B. Birm., M. S. Losowsky, M.B. Leeds, P. E. S. Loubser, M.B. Cape Town, Thomas McKendrick, M.B. Lond., Philip Markman, M.B. Cape Town, R. D. Montgomery, M.B. Cantab., P. D. Mulcahy, M.B. Cantab., Shapur Naimi, M.B. Birm., K. R. Norton, M.B. Lond., R. D. G. Peachey, M.B. Lond., Solomon Posen, M.B. Adelaide, D. D. Reid, M.D. Aberd., Patricia A. Russell, M.B. Lond., Elizabeth A. Ryan, M.B. Lond., Jacob Schneider, M.B. W'srand, D. G. Smith, M.B. Lond., J. R. Smythies, M.D. Cantab., G. M. Stern, M.B. Lond., D. W. (Raphael) Sumner, M.B. Manc., J. R. Tighe, M.B. Wales, A. E. P. Twort, M.B. Lond., Patricia G. Wallis, M.B. Lond., M. F. R. Waters, M.B. Cantab., D. J. Weatherall, M.B. Lpool, D. N. Whitmore, M.B. Cantab., F. W. Wright, B.M. Oxon.

Licences to practise were conferred upon the following, who have passed the final examination of the Conjoint Board:

J. W. Abrams, Oladipo Olujimi Akinkugbe, J. G. Allardice, A. C. Ames E. C. Ashby, Mary E. Ashworth, Rudrapa Mahalingapa Avati, Judith M. Babb, J. R. Ball, Nariman Sorabji Bamji, Frank Bannerman-Lloyd, Anne P. Barrett, Patricia A. Blackwell, Ingrid J. Booth, Helen D. Bower, N. A. Boyd, P. P. Bricknell, M. F. H. Bush, J. S. Cameron, M. I. D. Cawley, Michael Charlesworth, R. K. Clarke, L. J. Clein, B. J. Clement, Diana E. Clough, G. F. Cohen, Leonard Cook, Stephen Craske, A. N. Cruickshank, J. O. Dalrymple, D. J. C. Davies, E. T. L. Davies, J. B. Davis, W. R. Dean, Alison J. Dow, J. T. K. Duncan, Anthony Dunnill, N. J. L. D'Vaz, Margaret L. E. Eastcott, D. R. Edbrooke, Davnet A. V. Fenton, Frances E. Freeman, A. J. V. H. French, A. J. Gardner, Elzbieta E. Gielniewska, A. V. Gillespie, G. T. Gooding, Judith M. Hall, J. W. Harcup, Gerhard Hass, B. T. Hawley, Bernard Hayes, V. N. Highman, Oliver Holmes, J. M. Howell, Mary S. Howell, Doreen M. Hudson, Margaret J. Hunter Rowe, T. A. Hussell, P. B. Jacobs, R. W. James, Rosemary A. Johnson, O. P. Jones, Mary O. Joseph, Pesi Minoo Katrak, C. W. Keen, Anthony Kenyon, Angela R. Kosky, M. J. S. Langman, M. I. Leckie, J. P. Lee-Potter, L. A. Lees, Valerie Little, Li-Shih S. Lung, K. H. McCraith, G. W. McKenna, B. W. Maitland, Ronald Marks, Sylvie Marston, Margaret Masterton, Ann R. Matthews, T. S. Matthews, Nasser Salim Seif Meimary, Yvonne M. Metcalf, D. J. O. Mills, P. V. Mills, D. F. Munro, Janet A. Napper, J. L. Nimmo, B. F. Norris, J. B. Nuttall, J. O. Onyeachonam, A. A. Osindero, Mary W. Parry, P. G. Parry, P. O. D. Pharoah, J. W. Porter, A. C. Pugh, H. B. Raeburn, Teygaraj Ramsamy, Marjory M. B. Reid, N. A. Rety, A. B. Richards, G. A. Richardson, R. M. Riddell-Smith, Gwyneth M. Riley, R. R. Roberts, Hildegard M. I. Seeman, Olive P. Sharp, Muriel A. Shiel, R. M. Simons, Cynthia G. Smith, I. S. Smith, Simon Spragge, Shirley H. Stanness, J. F. Steele-Perkins, Hazel G. Stephens, M. P. Sternberg, D. J. Steward, J. D. M. Stewart, D. W. B. Summers, J. L. K. Tamakloe, Veronica Thatcher, M. J. A. Thompson, R. A. Thompson, M. K. Tidman, J. M. Todd, E. W. B. Varley, S. O. Wamuo, K. H. Warden, J. B. Warren, T. P. Welch, M. P. Wilderspin, M. C. T. Wilkes, G. E. Winbolt, Yvonne Young.

Postgraduate diplomas were conferred on those named in the report of the Royal College of Surgeons in our issue of Oct. 18 (p. 857) and on the following:

D.C.H.—Margaret S. Brothwood, Rashida Bano Razvi.
D.I.H.—Pannimadai Vaidiswaran Krishnamurti.
D.O.—R. J. M. Boucherat.

On Tuesday and Thursday, Dec. 9 and 11, at 5 P.M. at the college, Pall Mall East, S.W.1, Dr. W. S. C. Copeman will give the FitzPatrick lectures. His subject will be medical practice in the Tudor period.

North East Metropolitan Regional Board

The 8th annual (subscription) dinner of the board, held in London on Oct. 22, was attended by some 300 people, including members and officers of management committees, matrons, and doctors.

Sir Graham Rowlandson, chairman of the board, presided. Sir James Paterson Ross, F.R.C.S., responded for The Guests, and Mr. Frank Milton for The Hospital Management Committees of the Region.

Gairdner Foundation

This Canadian Foundation, which was set up in 1957, has announced its first international awards in arthritis and heart-disease.

The award of merit ($25,000) has been given to Dr. Alfred Blalock and Dr. Helen B. Taussig (both of Johns Hopkins University) for their work in cardiac surgery. Annual awards ($5000 each) have been made to Prof. Harry M. Rose and Prof. Charles Ragan (both of Columbia University, New York) for their discovery of a laboratory test for the diagnosis of rheumatoid arthritis; to Prof. W. D. M. Paton (Royal College of Surgeons of England) and Prof. Eleanor Zaimis (Royal Free Hospital School of Medicine) for their work on the methonium compounds; and to Dr. W. G. Bigelow (University of Toronto) for his development of the technique of hypothermia in cardiac surgery.

College of General Practitioners

On Sunday, Nov. 23, at 10 A.M., the college will hold a symposium at the Wellcome Building, 183, Euston Road, London, N.W.1. The subject for discussion is dyspepsia, and the speakers will include Dr. Desmond O'Neill, Dr. Richard Scott, Dr. R. R. Bomford, Mr. H. Daintree Johnson, and Dr. H. N. Levitt.

Fellowship for Freedom in Medicine

The annual general meeting of the Fellowship will be held on Saturday, Nov. 15, at 2 P.M., in Caxton Hall, London, S.W.1. Further particulars may be had from the hon. secretary, Dr. E. C. Warner, 45, Nottingham Place, W.1.

The Biochemical Society will hold a meeting on Friday, Nov. 14, at 2 P.M., at the National Institute of Medical Research, The Ridgeway, Mill Hill, London, N.W.7.

The London Jewish Hospital Medical Society will meet on Thursday, Nov. 27, at 8.15 P.M., at 11, Chandos Street, W.1, when Dr. Sheila Sherlock will speak on advances in the treatment of diseases of the liver.

A joint meeting of the British Society for Immunology and the British Association of Allergists will be held on Friday and Saturday, Nov. 14 and 15, at the Wellcome Building, Euston Road, London, N.W.1. On Friday, at 2.30 P.M., there will be a symposium on immunological aspects of allergic disorders. Further particulars may be had from Dr. R. G. White, London Hospital, E.1.

Appointments

BIRCHALL, J. C., M.B. Lpool, D.P.H.: M.O.H., Sutton, Cheam, and Banstead.
ELLIS, D. D., M.B. Belf., D.P.M.: consultant psychiatrist, St. Lawrence's Hospital, Bodmin, Cornwall.
GARDNER, A. M. N., B.M. Oxon, F.R.C.S.: consultant surgeon, Exeter clinical area.
KERR, A. R., M.B. Glasg., D.A.: S.H.M.O. in anæsthetics, Huddersfield group of hospitals.
MURRAY, B. T. A., M.B. N.U.I., D.P.H., D.C.H.: assistant M.O.H. and school M.O., Dudley.
OATES, E. GWENDOLINE M., M.D. Leeds: senior school M.O., Sheffield.
SUFFERN, W. S., M.D. Leeds, M.R.C.P.: part-time consultant in general medicine, Harrogate General Hospital and other Harrogate and Ripon group hospitals.
*WELCH, G. E., M.B. Durh., D.P.H.: deputy M.O.H. and deputy principal school M.O., Leeds.
WHEELAN, LORNA, M.D. Aberd., D.P.M.: part-time consultant in child psychiatry, King's College Hospital, London.

Manchester Regional Hospital Board

CAPPER, L. C., M.B. Lond., M.R.C.P.: consultant chest physician, Blackpool and Fylde group of hospitals.
GUNSON, H. H., M.B. Manc.: S.H.M.O., regional blood-transfusion service.
MCLENACHAN, JOHN, G.M., M.B. Glasg., F.R.C.S.E., D.O.: consultant ophthalmologist, Rochdale, Bury, and Oldham groups of hospitals.

Newcastle Regional Hospital Board

BELL, S. M., M.B. Durh.: assistant pathologist (S.H.M.O.), North West Durham group of hospitals.
GOURLAY, J. S., M.B. Leeds, D.O.M.S.: consultant ophthalmologist, North and South Tees-side groups of hospitals.
HONNEYMAN, F. D., M.D. Belf., M.R.C.P.I.: assistant physician (S.H.M.O.), geriatric unit, Sunderland group of hospitals.
JENNINGS, J. H., M.B. Edin.: senior casualty officer, North Tees-side group of hospitals.
KIRBY, J. R., M.B. Leeds, F.F.R., D.M.R.D.: consultant radiologist, Hartlepool groups of hospitals.
MARSHALL, MERLIN, M.B. Cantab., F.F.A. R.C.S.: consultant anæsthetist, Newcastle upon Tyne group of hospitals.
MITCHELL, A. P. B., M.B. Durh., M.R.C.O.G.: consultant obstetrician and gynæcologist, South East Northumberland and Newcastle upon Tyne group of hospitals.
ROOZE, P. M., M.R.C.P.: consultant chest physician, South Shields group of hospitals.
SERGEANT, J. C. B., M.B. Edin., F.R.C.S.: consultant general surgeon, North West Durham group of hospitals.

* Amended note.

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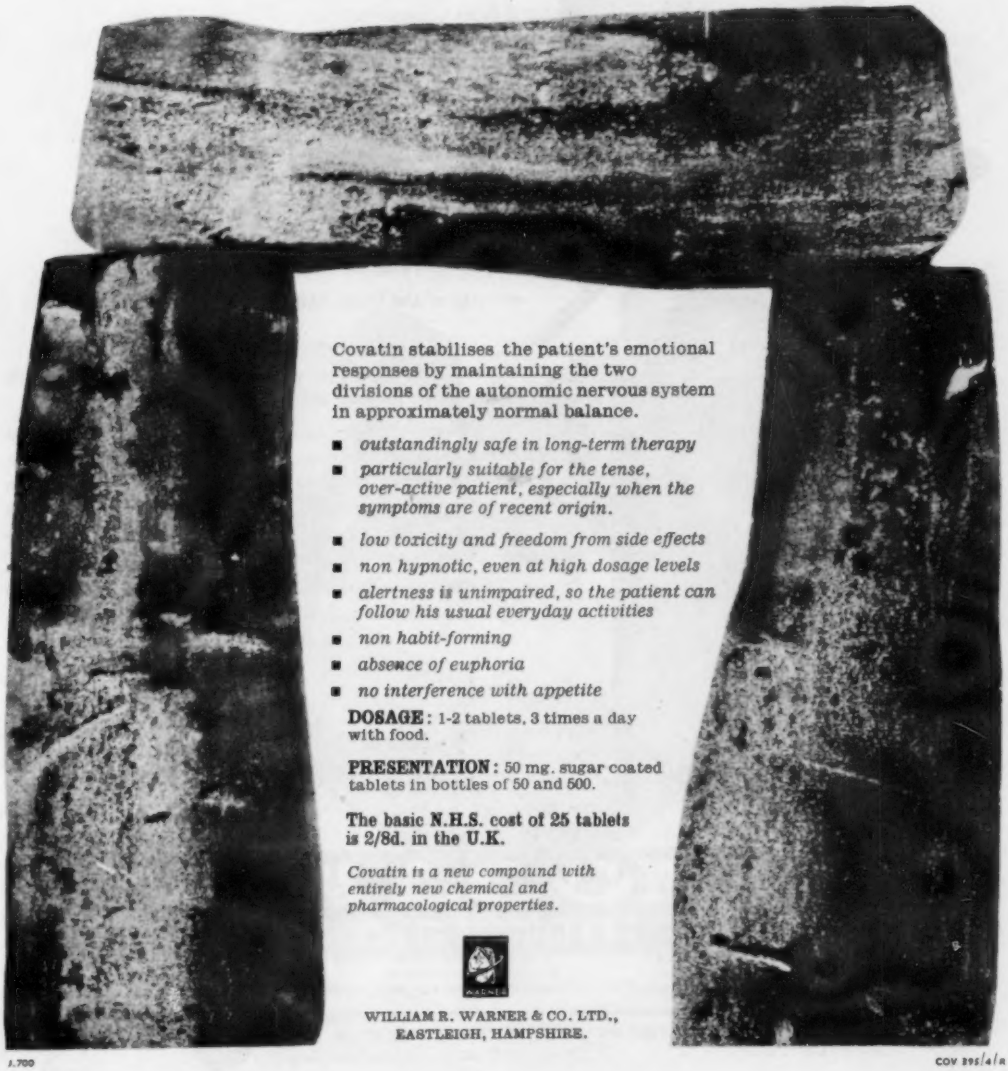

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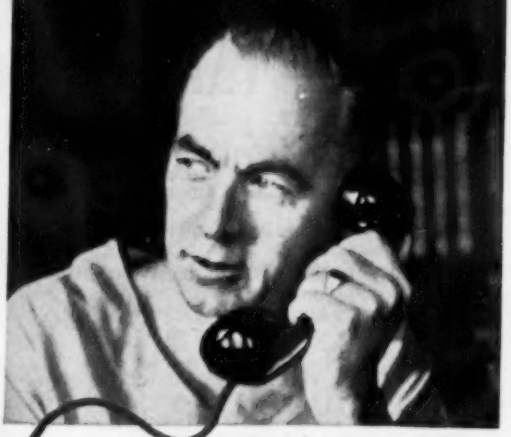

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The Terms and Conditions of Service of Hospital Medical and Dental Staff apply to all N.H.S. hospital posts we advertise, unless otherwise stated. Canvassing disqualifies, but candidates may normally visit the hospital by appointment.

Academic and Educational

ROYAL COLLEGE OF PHYSICIANS OF LONDON

Dr. E. MILDRED CREAK, F.R.C.P., will deliver the CHARLES WEST LECTURE on TUESDAY, 18TH NOVEMBER, 1958, at 5 P.M., at the College, Pall Mall East, S.W.1.

Subject: "Child Health and Child Psychiatry—Neighbours or Colleagues?"

Any member of the Medical Profession admitted on presentation of doctor's card.

By order of the President.

HAROLD BOLDERO, Registrar.

UNIVERSITY COLLEGE LONDON

(Gower-street, W.C.1)

Dr. D. A. DENTON (Melbourne) will give a PUBLIC LECTURE entitled "The Control of Secretion of the Transplanted Adrenal Gland" on WEDNESDAY, 19TH NOVEMBER, at 5.30 P.M.

Admission free, without ticket.

E. A. L. GUETERBOCK, Secretary.

THE NUFFIELD FOUNDATION

NUFFIELD INSTITUTE FOR MEDICAL RESEARCH

RESEARCH FELLOWSHIPS

The Nuffield Foundation, as an experiment, is prepared to offer 1 research fellowship annually in each of the 3 years 1958, 1959, and 1960, tenable at the Nuffield Institute for Medical Research at Oxford, to enable a suitably qualified person who intends to follow an academic career in obstetrics or pædiatrics in the United Kingdom to concentrate for a year on animal experiments directly related to basic physiology or pharmacology in the fœtus or the newborn.

Each fellowship will be tenable for 1 year and is limited to a graduate in medicine of a University within the British Commonwealth, who should *either* have completed an appointment as Registrar (or its equivalent) in an approved department of obstetrics or pædiatrics, *or* be seconded for 1 year from such an appointment. He should also have obtained the higher qualification appropriate to his chosen specialty. The stipend will be within the approved range of salaries for Senior Registrars under the National Health Service.

Applications for the award beginning in 1959 must be received before 15th February, 1959, by the Director, The Nuffield Foundation, Nuffield Lodge, Regent's Park, N.W.1, from whom full particulars and application forms can be obtained.

L. FARRER-BROWN, Director of the Nuffield Foundation.

THE KETTLE MEMORIAL LECTURE

The Kettle Memorial lecture will be delivered by Dame JANET M. VAUGHAN, D.B.E., D.M., F.R.C.P., on "The Relation of Radiation Dose to Radiation Damage with Reference to Bone-seeking Isotopes" in the Physiology Lecture Theatre, St. Bartholomew's Hospital Medical College, Charterhouse-square, London, E.C.1, on THURSDAY, 27TH NOVEMBER, 1958, at 5 P.M.

Medical practitioners and medical undergraduates are invited to attend.

L.M.S.S.A.

FINAL EXAMINATION: MEDICINE and SURGERY, 8th December, 1958, 12th January, 9th February, 1959. MIDWIFERY and PATHOLOGY, 9th December, 1958, 13th January, 10th February, 1959. MASTERY OF MIDWIFERY, May and November. DIPLOMA IN INDUSTRIAL HEALTH, July and December.

For regulations apply REGISTRAR, Apothecaries Hall, Black Friars-lane, London, E.C.4.

ROYAL COLLEGE OF PHYSICIANS OF EDINBURGH

KIRK DUNCANSON FELLOWSHIP FOR MEDICAL RESEARCH

The Council of the Royal College of Physicians of Edinburgh will award a Kirk Duncanson Research Fellowship of the value of £800 p.a. for 2 years to commence on 1ST FEBRUARY, 1959.

Applicants, who should state the nature of the proposed research and the place where it is intended to carry it out, must send their applications before 10th January, 1959, to The Secretary, Royal College of Physicians, 9, Queen-street, Edinburgh, 2.

GLASGOW POST-GRADUATE MEDICAL EDUCATION COMMITTEE

COURSE IN PSYCHOLOGICAL MEDICINE

A two-term part-time Course has been organised to run during the Candlemas (5TH JANUARY–14TH MARCH) and Whitsun (13TH APRIL–20TH JUNE) terms, 1959. The Course is designed to supply formal training for graduates who intend to specialise in Psychiatry, but is open to all registered medical practitioners. The instruction will amount to 10 hours per week, given on Monday, Tuesday, and Thursday afternoons and Saturday mornings. During the Candlemas term, instruction will be provided in disciplines basic to Psychiatry. During the Whitsun term, instruction will be on clinical subjects and students will attend various psychiatric hospitals. The fee for the Course is £35.

For further details, application should be made to the Director of Post-Graduate Medical Education, The University, Glasgow, W.2.

GUY'S HOSPITAL MEDICAL SCHOOL, S.E.1. Applications are invited for the following appointments in the Department of Bacteriology:—

(*a*) JUNIOR LECTURER or LECTURER. Salary range £900–£1750.

(*b*) LECTURER or SENIOR LECTURER. Salary range £1100–£1950.

Salaries will depend on qualifications and experience, with superannuation and family allowance. Candidates should have a medical or scientific degree and an interest in a fundamental approach to microbiological problems.

Applications should be submitted, on a form obtainable from the Dean, not later than 14th November, 1958.

BRITISH ASSOCIATION OF PHYSICAL MEDICINE

A WEEKEND COURSE designed primarily for those taking the Diploma in Physical Medicine will be held on 16TH, 17TH, and 18TH JANUARY, 1959.

Further details can be obtained from the Honorary Secretary of the Association, 47, Lincoln's Inn Fields, London, W.C.2.

THE UNIVERSITY OF LEEDS. Department of Forensic MEDICINE. Applications are invited for appointment to the post of LECTURER or SENIOR LECTURER in the Department of Forensic Medicine at a salary on the scale £1200–£100–£1600 (efficiency bar)–£100–£2400 for a Senior Lecturer, according to age, qualifications and experience.

Applications (3 copies), stating date of birth, qualifications and experience, together with the names of 3 referees, should reach the Registrar, the University, Leeds, 2 (from whom further particulars may be obtained), not later than 12th December, 1958.

THE UNIVERSITY OF LIVERPOOL. Applications are invited for the post of LEVERHULME LECTURER IN MEDICAL PARASITOLOGY in the Department of Parasitology and Entomology of the School of Tropical Medicine at an initial salary within the range of £1200–£1700 p.a., according to age, qualifications and experience.

Applications, stating age, academic qualifications and experience, together with the names of 3 referees, should be received not later than 31st January, 1959, by the Registrar, The University, Liverpool, 3, from whom further particulars of the conditions of appointment may be obtained.

UNIVERSITY OF BIRMINGHAM. Faculty of Medicine. Applications are invited for the post of LECTURER IN PHYSIOLOGY (preclinical or non-medical). Applicants should be graduates in medicine or science and should have had post-graduate experience in some branch of physiology. Salary within the range: Preclinical £900–£1900, non-medical £900–£1650 p.a., plus F.S.S.U. and family allowance.

Applications (6 copies), together with the names of 3 referees, should be sent not later than 1st December, 1958, to the Assistant Registrar, Medical School, Birmingham, 15, from whom further particulars may be obtained.

UNIVERSITY OF BELFAST. Applications are invited from medically qualified graduates for a post of either (*a*) TUTOR or (*b*) ASSISTANT LECTURER in the Department of Microbiology from 1st February, 1959. The salary scales are (*a*) £700–£50–£850, and (*b*) £770–£100–£1100. Initial placing on either scale depends on experience and qualifications.

Letters of application (2 copies), should be submitted by 30th November, 1958. Further particulars may be obtained from G. R. COWIE, M.A., LL.B., J.P., Secretary.

AUSTRALIA. UNIVERSITY OF MELBOURNE. Applications are invited for the position of SENIOR LECTURER IN ANATOMY (gross anatomy). The salary range is £A2200–£2800 p.a. Initial salary will be determined according to qualifications and experience. Superannuation similar to F.S.S.U. in Great Britain will be provided.

Conditions of appointment may be obtained from the Secretary, Association of Universities of the British Commonwealth, 36, Gordon-square, London, W.C.1. Applications close, in London and Australia, on 30th November, 1958.

Hospital Services: Senior Appointments

EASTMAN DENTAL HOSPITAL AND INSTITUTE OF DENTAL SURGERY (UNIVERSITY OF LONDON), Gray's Inn-road, London, W.C.1. Applications are invited for the part-time appointment of CONSULTANT RADIOLOGIST on the basis of 5 sessions a week. The appointment is in accordance with the terms and conditions of service of hospital medical and dental staff.

Applications, including the names of 2 referees, should be sent before 24th November, 1958, to the Director, from whom further particulars may be obtained.

NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD.

1. CONSULTANT PHYSICIAN, 3 half-days a week, Royal Northern Hospital, Holloway, N.7 (277 Beds).

Applications before 5th December, 1958.

2. CONSULTANT VENEREOLOGIST, 5 half-days a week (including some evening sessions), Central Middlesex Hospital, Park Royal, N.W.10 (726 Beds).

Applications before 10th December, 1958.

Hospitals may be visited by direct appointment.

Application forms obtainable from and returnable to Secretary, North West Metropolitan Regional Hospital Board, 40, East-bourne-terrace, W.2.

ROYAL MARSDEN HOSPITAL, Fulham-road, London, S.W.3. Applications are invited for the post of CONSULTANT GYNÆCOLOGIST for 1 or 2 sessions a week, at the above Hospital. The post is available immediately.

Applications, quoting age, education, experience, and giving the names of 3 referees, should reach the House Governor by 30th November, 1958.

ROYAL MARSDEN HOSPITAL, Fulham-road, London, S.W.3. Applications are invited for a post of CONSULTANT in the Radiotherapy Department at the above Hospital. The post is available immediately and is for 5 sessions a week. A member of the Department is a candidate.

Applications, quoting age, education, experience, and giving the names of 3 referees, should reach the House Governor by 30th November, 1958.

ST. JOHN'S HOSPITAL FOR DISEASES OF THE SKIN, Lisle-street, Leicester-square, London, W.C.2. Applications are invited for the appointment of Part-time CONSULTANT RADIOTHERAPIST with opportunities for teaching and research in conjunction with the Institute of Dermatology.

Applications (10 copies), stating age, qualifications and experience, with names of 3 referees, to the Secretary to the Board, not later than 20th December, 1958.

THE HOSPITAL FOR SICK CHILDREN, Great Ormond-street, London, W.C.1. Applications are invited for the post of CONSULTANT PHYSICIAN in Charge of the Department of Dermatology, attending 3 sessions per week. Applicants should hold the Fellowship of the Royal College of Physicians of London.

Further particulars and form of application, which must be returned not later than 8th December, 1958, may be obtained from the undersigned.

H. F. RUTHERFORD, House Governor and Secretary.

THE HOSPITAL FOR SICK CHILDREN, Great Ormond-street, London, W.C.1. Applications are invited for the post of CONSULTANT PATHOLOGIST in Charge of the Department of Chemical Pathology. The candidate may elect to be either full-time or maximum part-time.

Further particulars and form of application, which must be returned by Monday, 8th December, 1958, may be obtained from the undersigned.

H. F. RUTHERFORD, House Governor and Secretary.

BIRMINGHAM REGIONAL HOSPITAL BOARD. Whole-time CONSULTANT PATHOLOGIST, Birmingham (Dudley Road) Group of hospitals. Duties mainly at Dudley Road and St. Chad's Hospitals. Wide experience specialty and higher qualification required.

Applications (15 copies), stating age, qualifications, present and previous appointments, and giving details of 3 referees, to Secretary, 10, Augustus-road, Birmingham, 15, by 8th December, 1958.

BRISTOL. UNITED BRISTOL HOSPITALS. Applications are invited for the whole-time appointment of CONSULTANT RADIOLOGIST.

Applications, stating age, qualifications and experience, together with the names of 3 referees, should be sent to the Secretary to the Board, Bristol Royal Infirmary, Bristol, 2 (from whom further particulars can be obtained), by Monday, 1st December, 1958.

CAMBRIDGE. THE UNITED CAMBRIDGE HOS-PITALS. Applications are invited for the post of CONSULTANT PSYCHIATRIST (whole-time or maximum part-time) with a major interest in, and experience of, the problems of student mental health. An honorary contract will be offered to the successful candidate by the East Anglian Regional Hospital Board, and beds will be available at Fulbourn Hospital. The main duties of the post will be in the Psychiatric Outpatient Department at Addenbrooke's Hospital.

Applications (12 copies), on which full professional and personal details should be entered, with the names of 3 referees, should be forwarded to the Secretary, The United Cambridge Hospitals, Addenbrooke's Hospital, Cambridge, by 29th November, 1958.

CANTERBURY AND ISLE OF THANET HOSPITAL MANAGEMENT COMMITTEES. Applications are invited for the post of ANÆSTHETIST (Consultant or Senior Hospital Medical Officer grade) for the period 26th January–3rd May, 1959, inclusive.

Applications, with full details and names of referees, to be addressed to the Group Secretary, Central Office, Nunnery Fields Hospital, Canterbury, as soon as possible.

EXETER CLINICAL AREA. SOUTH WESTERN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of a CONSULTANT SURGEON in the Exeter Clinical Area. The appointment will be on a maximum part-time basis (9 sessions). The successful candidate will have charge of beds at Torbay Hospital, Torquay, and will also be required to visit other hospitals in the clinical area as determined by the Regional Board.

Applications (12 copies), stating date of birth, qualifications and experience, together with the names and addresses of 2 referees, should be sent to the Secretary of the Regional Hospital Board, 27, Tyndalls Park-road, Bristol, 8, not later than 29th November, 1958.

RE-ADVERTISEMENT

MANCHESTER REGIONAL HOSPITAL BOARD. Maximum Part-time CONSULTANT PSYCHIATRIST to the Blackpool and Fylde Group of hospitals, outpatient clinics at the Victoria Hospital, Blackpool, and charge of beds at Wesham Park Hospital. The post includes an appointment as visiting Psychiatrist to Lancaster Moor (Mental) Hospital, Lancaster (2500 Beds) for 2–3 sessions a week. Wide experience and higher qualifications desirable and residence in the Blackpool area essential.

Application forms from the Senior Administrative Medical Officer to the Board, Cheetwood-road, Manchester, 8, to be returned by 18th November, 1958.

MANCHESTER REGIONAL HOSPITAL BOARD. Whole-time RESIDENT or NON-RESIDENT ASSISTANT PHYSICIAN (Senior Hospital Medical Officer) AND DEPUTY MEDICAL SUPERINTENDENT, Monsall Hospital, Manchester. The appointment is to the infectious diseases beds at Monsall Hospital (156) and at Ladywell Hospital, Salford (24), and will include duties on the chest diseases (142 Beds, both tuberculous and non-tuberculous) and geriatric wards (24 Beds) at Monsall Hospital. Appointee will work under the guidance of consultants. Small house available for married man but, if non-resident, he should reside within reasonable distance of the Hospital. Candidates should have good general medical experience and special experience of infectious diseases and/or chest diseases.

Application forms from the Senior Administrative Medical Officer to the Board, Cheetwood-road, Manchester, 8, to be returned by 24th November, 1958.

LEEDS REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of Locum ASSISTANT PSYCHIATRIST (Senior Hospital Medical Officer grade) for duties at Stanley Royd Hospital, Wakefield (1976 Beds).

Applications, giving full details of age, qualifications and previous appointments (with dates), together with the names and addresses of 3 referees, should be addressed to the Secretary, Park Parade, Harrogate, by 12th November, 1958.

LIVERPOOL REGIONAL HOSPITAL BOARD. Winwick HOSPITAL. Applications are invited for the post of Whole-time ASSISTANT PSYCHIATRIST (Senior Hospital Medical Officer) with duties at the above Hospital and outpatient clinics outside the Hospital. Applicants should possess the D.P.M. and have reasonable experience in psychiatry, including practical knowledge of outpatient work.

Forms of application from Dr. T. Lloyd Hughes, Senior Administrative Medical Officer, Liverpool Regional Hospital Board, 55, Castle-street, Liverpool, 2, to be returned not later than 29th November, 1958.

VINCENT COLLINGE, Secretary to the Board.

NORTH EAST METROPOLITAN REGIONAL HOS-PITAL BOARD.

Hertford Group of Hospitals

Part-time CONSULTANT VENEREOLOGIST for 2 sessions a week. Duties at Herts and Essex General Hospital, Bishop's Stortford.

Colchester Group of Hospitals

Full- or Maximum Part-time CONSULTANT RADIOLOGIST. Duties mainly at Essex County Hospital, Colchester, but including weekly session at Royal Eastern Counties and Severalls Hospitals.

Warley Hospital, Brentwood

Full-time CONSULTANT PSYCHIATRIST. Duties will include outpatient clinics. Modern house available.

Ilford Child Guidance Clinic

Part-time CONSULTANT PSYCHIATRIST for 4 sessions a week to act as Medical Director of Clinic.

Applications (5 copies), stating post concerned, and names of 3 referees, should reach the Secretary, 40, Eastbourne-terrace, W.2, by Saturday, 6th December, 1958.

NORTH WEST METROPOLITAN REGIONAL HOS-PITAL BOARD. BEDFORD GENERAL HOSPITAL. (424 Beds.) Locum Tenens ORTHOPÆDIC SURGEON of Consultant, Senior Hospital Medical Officer, or Senior Registrar status required immediately for up to 7 sessions weekly. Probable duration 3 months. Remuneration according to status.

Apply to Group Secretary, Bedford Group Hospital Management Committee, 3, Kimbolton-road, Bedford. Telephone 5401, Extension 22.

OXFORD REGIONAL HOSPITAL BOARD. Consultant in General Medicine, whole-time or maximum part-time, to the Area Department in General Medicine of the Swindon Cirencester area, based on the new Princess Margaret Hospital, Swindon (80 general medical beds). Applicants must have wide experience in general medicine, and a higher qualification is essential.

Applications, stating age, experience and qualifications, and giving the names of 3 referees, should reach the Secretary, 43, Banbury-road, Oxford, by 6th December, 1958.

PLYMOUTH CLINICAL AREA. SOUTH WESTERN REGIONAL HOSPITAL BOARD. Applications are invited from registered medical practitioners for the appointment of Whole-time SENIOR CASUALTY OFFICER with duties mainly at the Plymouth, South Devon and East Cornwall Hospital, Plymouth. The successful candidate should possess a higher qualification in surgery and will be required to take charge of the Casualty Department and work under the general supervision of the Consultant Surgeons and Orthopædic Surgeons in the Group. The appointment will be for a period not exceeding 4 years. Salary within the range £1653 15s.–£52 10s.–£2126 5s. for candidate of 32 years and over, and £1548 15s.–£52 10s.–£2126 5s. for candidate aged 30 years and less.

Applications (12 copies), stating date of birth, qualifications and experience, together with the names and addresses of 2 referees, should be sent to the Secretary of the Regional Hospital Board, 27, Tyndalls Park-road, Bristol, 8, not later than 29th November, 1958.

SCOTLAND. NORTHERN REGIONAL HOSPITAL BOARD. Applications are invited for the post of Part-time CONSULTANT in General Surgery and SURGEON-SUPERINTENDENT, Belford Hospital, Fort William (9 notional half-days). A suitable house is available.

Schedules of application and further particulars may be obtained from the undersigned, with whom applications should be lodged, by 1st December, 1958.

A. M. FRASER, M.D.,
Secretary and Administrative Medical Officer.
Office of the Northern Regional Hospital Board,
Reay House, 17, Old Edinburgh-road, Inverness.

SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of Whole-time ASSISTANT ORTHOPÆDIC AND CASUALTY SURGEON to the Orthopædic Department of the Royal Alexandra Infirmary, Paisley. Salary (at age 32 and over) on the scale £1653 15s.–£52 10s.–£2126 5s.

Applications (16 copies), stating date of birth, qualifications, experience, present appointment, and the names of 3 referees, to reach the Secretary, Western Regional Hospital Board, 64, West Regent-street, Glasgow, C.2, not later than 30 days after the publication of this advertisement.

SHEFFIELD REGIONAL HOSPITAL BOARD. Consultant ANÆSTHETIST (maximum part-time) required at Leicester. At least 50 % of the time will be spent at the Thoracic Unit, Leicester Isolation Hospital, and Chest Unit; remainder of time in general hospitals.

Application forms and further details from Senior Administrative Medical Officer, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield. Forms to be returned by 6th December, 1958.

SOUTH RUISLIP, MIDDLESEX. THE USAF HOSPITAL, SOUTH RUISLIP, MIDDLESEX, has a vacancy on the medical staff for a qualified OBSTETRICIAN AND GYNÆCOLOGIST. Salary will depend on professional training but will not exceed £1850 p.a.

Interested Medical Officers should write to Chief of Professional Services, 7520th USAF Hospital, US Air Base, South Ruislip.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. STODMARSH ROAD HOSPITAL, CANTERBURY, and Clinics in East Kent. Locum SENIOR HOSPITAL MEDICAL OFFICER in Chest Diseases required for approximately 1 year. Appointment includes responsibility for 30-bedded Chest Unit and work as required in Chest Clinics in East Kent; must be prepared to live in or near Canterbury.

Applications, with full details, and 3 names for reference, to be sent as soon as possible to Group Secretary, Central Office, Nunnery Fields Hospital, Canterbury.

SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD requires Part-time CONSULTANT RADIOLOGIST (2 half-days per week) for the Redhill Group. Duties mainly at Horsham Hospital, Sussex. Candidates must have D.M.R. and wide experience in radiology.

Applications by letter (5 copies), giving date of birth, qualifications, experience, and names of 3 referees, to Secretary (S.F.), South West Metropolitan Regional Hospital Board, 40, Eastbourne-terrace, W.2, by 6th December, 1958. Applicants may visit Hospital by local arrangement.

SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD requires a Locum CONSULTANT in General Medicine for 9 sessions weekly in the Winchester Group of hospitals for approximately 4–6 months. The main duties will be at the Royal Hampshire County Hospital, Winchester (327 Beds), and the successful candidate will be required to visit other hospitals in the Group. Salary will be in accordance with the terms and conditions of service of hospital medical and dental staff.

Applications (3 copies), stating age, qualifications and experience, with names and addresses of 2 referees, to the Area Secretary, Highcroft, Romsey-road, Winchester, by 17th November, 1958.

WELSH REGIONAL HOSPITAL BOARD. Whole-time CONSULTANT PSYCHIATRIST, Morgannwg Hospital, Bridgend (2359 Beds). Applicants must have had wide experience in psychiatry, hold a Diploma in Psychological Medicine, be competent to take clinical responsibility and to participate in the work of the Associated Outpatient Clinics and Domiciliary Consultant Service in the area served by the Hospital. Electroencephalographic experience will be an additional advantage. Married accommodation available if required.

Applications (12 copies), naming 3 referees, to Senior Administrative Medical Officer, Temple of Peace, Cathays Park, Cardiff, within 21 days.

CROOKSLING, Co. DUBLIN. ST. BRIGID'S HOSPITAL. The Dublin Board of Assistance invites applications from doctors with at least 5 years' experience for appointment to the post of Temporary ASSISTANT RESIDENT MEDICAL SUPERINTENDENT for a period of 1 year in the first instance. Salary: £1226 p.a. inclusive, less deduction of £60 a year for unfurnished residence.

Full particulars and application forms may be obtained from the Establishment Department, 1, James's-street, Dublin. Latest date for acceptance of completed application forms 18th November, 1958. J. NOLAN, Secretary.

NORTHERN IRELAND HOSPITALS AUTHORITY. Applications are invited for a post as CONSULTANT PHYSICIAN at the Royal Victoria Hospital, Belfast. Preference will be given to candidates with an interest in metabolic medicine. The appointment will be on a part-time basis of 7 half-days of duty weekly, and the terms and conditions will be in accordance with the Authority's application of the Spens Report to Northern Ireland.

Applications to be made on a form obtainable (with further particulars) from the Secretary, Northern Ireland Hospitals Authority, 44–46, Queen-street, Belfast, and to be returned not later than 12th December, 1958.

AUSTRALIA. ALFRED HOSPITAL BOARD OF MANAGEMENT, Commercial-road, PRAHRAN, VICTORIA, AUSTRALIA. Applications invited from appropriately qualified medical practitioners for appointment to take charge of the Cardiovascular Diagnostic Service. Clinicians to this Hospital are very active in the clinical and research aspects of cardiovascular diseases and there is a well-established cardiac surgery team whose work is based on a strongly physiological and research background.

Duties to include: administration of routine diagnostic services in heart-diseases (including electrocardiography, phonocardiography, cardiac catheterisation and other observations necessary for cardiac surgery).

Qualifications: senior degree and experience in cardio-pulmonary physiology and cardiovascular diagnostic techniques as outlined above.

Salary (within the range of £A2250–£A3000 p.a.) and status will be determined in accordance with qualifications and experience. Successful applicant will have the right of private practice within the Hospital. Appointment in the first instance will be for a period of 3 years.

Applications, giving details of qualifications and experience and date available to commence, close with the undersigned on 1st December, 1958. C. G. RANKIN, Manager.

AUSTRALIA. THE ROYAL MELBOURNE HOSPITAL invites applications from suitably qualified medical practitioners for appointment as Part-time ASSISTANT TO THE NEUROSURGEON. Salary £1650 p.a. Appointment is to commence as soon as possible. Further details may be obtained from the Medical Superintendent.

Applications, on the prescribed form, obtainable from the undersigned, close on 21st November, 1958.

AFTON MORCOM, Manager.

U.S.A. PENNSYLVANIA HOSPITAL, UNIVERSITY OF PENNSYLVANIA, PHILADELPHIA. NEUROLOGICAL FIRST ASSISTANT required at the Neurological Unit of the above Hospital for a period of 1 or more years. Experience of electroencephalography and neurophysiology advantageous but not essential. Salary $8000 p.a.

Applications, including full biographical details together with reprints of original work, should reach Dr. F. A. ELLIOTT, 56, Wimpole-street, W.1, before 15th December, 1958.

CANADA. MANITOBA. Psychiatrists required immediately at the Hospitals for Mental Diseases located at Brandon and Selkirk, Manitoba, Canada. Salaries range from $6960 to $9120 p.a. for medical personnel without certification; and from $9480 to $12000 p.a. for certified psychiatrists. These salaries are subject to deduction of $100 per month for furnished house, or suite, plus full maintenance for each physician including his family. Applicants must be graduates of British medical schools; eligible for registration with the College of Physicians and Surgeons of Manitoba; and have 1 year of general hospital experience in general or psychiatric practice. Preference will be given to applicants with their certification in psychiatry. Passage money may be advanced if required, to be partially recovered by monthly pay deductions.

Applications, with full particulars and the names of 2 referees, may be addressed to the Provincial Psychiatrist, Psychopathic Hospital, Winnipeg, 3, Manitoba, from whom full details may be obtained.

Hospital Services: Junior Appointments

ANNIE McCALL MATERNITY HOSPITAL, Jeffreys-road, S.W.4. Applications are invited from registered Women medical practitioners for the post of RESIDENT OBSTETRIC HOUSE SURGEON (post recognised for the D.Obst.R.C.O.G.). Appointment is for a period of 6 months, vacant 1st December, 1958.

Applications, stating age, qualifications, with dates, and nationality, accompanied by copies of 3 recent testimonials, to the Secretary not later than 21st November, 1958.

BETHNAL GREEN HOSPITAL, Cambridge Heath-road, E.2. HOUSE PHYSICIAN (pre-registration), immediate vacancy.

Apply, stating experience, with copies of 2 testimonials, to Hospital Secretary.

CENTRAL MIDDLESEX HOSPITAL, Park Royal, N.W.10. Pre-registration RESIDENT HOUSE OFFICER required in Obstetrics and Gynæcology. Post recognised for D.Obst.R.C.O.G. and M.R.C.O.G. examinations. Pre-registration candidates only will be considered. Post vacant end of November.

Applications, with 2 testimonials, to Medical Director by 14th November.

CHILDREN'S HOSPITAL, Sydenham, S.E.26. House OFFICER (medicine and surgery) required 9th December. Recognised for D.C.H.

Apply, naming 2 referees, to Administrative Officer, by 17th November.

CONNAUGHT HOSPITAL, Walthamstow, E.17. (123 Beds.) HOUSE SURGEON required for 6 months. Recognised for F.R.C.S.

Applications, with full details and copies of 2 recent testimonials, should be sent immediately to Secretary, Forest Group Hospital Management Committee, Langthorne-road, E.11.

ELIZABETH GARRETT ANDERSON HOSPITAL, Euston-road, N.W.1. (ROYAL FREE HOSPITAL GROUP.) Applications are invited from pre-registration and registered Women medical practitioners for the post of FIRST HOUSE PHYSICIAN for Medicine and Pædiatrics to become vacant 1st January, 1959. Appointment for 6 months. Salary in accordance with Ministry of Health scale for House Officers.

Applications, with copies of 3 recent testimonials, should be sent to the Secretary, Elizabeth Garrett Anderson Hospital, by 20th November, 1958.

ELIZABETH GARRETT ANDERSON HOSPITAL, Euston-road, N.W.1. (ROYAL FREE HOSPITAL GROUP.) Applications are invited from pre-registration and registered Women medical practitioners for the post of SECOND HOUSE PHYSICIAN. Appointment for 6 months from 1st January, 1959. Salary according to Ministry of Health scale for House Officers.

Applications, with copies of 3 recent testimonials, should be sent to the Secretary, Elizabeth Garrett Anderson Hospital, by 20th November, 1958.

ELIZABETH GARRETT ANDERSON HOSPITAL, Euston-road, N.W.1. (ROYAL FREE HOSPITAL GROUP.) Applications are invited from pre-registration and registered Women medical practitioners for the post of OBSTETRIC HOUSE SURGEON (recognised for the M.R.C.O.G.). Duties to commence 1st January, 1959. Appointment for 6 months. Salary in accordance with Ministry of Health scale for House Officers.

Applications, with copies of 3 recent testimonials, to be sent to the Secretary, Elizabeth Garrett Anderson Hospital, by 20th November, 1958.

ELIZABETH GARRETT ANDERSON HOSPITAL, Euston-road, N.W.1. (ROYAL FREE HOSPITAL GROUP.) Applications are invited from pre-registration and registered Women medical practitioners for the post of SECOND HOUSE SURGEON. Appointment for 6 months from 1st January, 1959. Salary in accordance with Ministry of Health scale for House Officers.

Applications, with copies of 3 recent testimonials, should be sent to the Secretary, Elizabeth Garrett Anderson Hospital, by 20th November, 1958.

HIGHLANDS GENERAL HOSPITAL, Winchmore Hill, N.21. ORTHOPÆDIC HOUSE SURGEON, Senior House Officer grade. Some E.N.T. and emergency general surgery. New operating-theatre, Outpatient and Casualty Department.

Applications, with copies of 3 testimonials and name and address of 1 referee, to Hospital Secretary.

HIGHLANDS GENERAL HOSPITAL, Winchmore Hill, London, N.21. HOUSE SURGEON for Gynæcological and General Surgery.

Applications, with copies of 3 testimonials and name and address of 1 referee, to Hospital Secretary.

HACKNEY HOSPITAL, London, E.9. (General—850 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER (casualty), vacant 10th December. The Department is supervised by the Orthopædic Surgeon, and the post is recognised for the F.R.C.S.

Apply Secretary, above address, by 21st November, quoting HH/CO.

HACKNEY HOSPITAL, London, E.9. (General—850 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER (orthopædics), vacant 10th December. The Senior House Officer works directly under the Consultant in a 36-Bed unit; the post offers excellent experience and is recognised for the F.R.C.S.

Apply Group Secretary, above address, by 21st November, quoting HH/O.

HOSPITAL OF ST. JOHN AND ST. ELIZABETH, 60, Grove End-road, London, N.W.8. Applications are invited from pre-registration or registered medical practitioners (Male) for the appointment of HOUSE SURGEON to begin 1st January, 1959. Appointment will be for a period of 6 months. National Health Service salary.

Applications to reach the Secretary on or before Friday, 28th November, together with copies of 3 recent testimonials.

HOSPITAL OF ST. JOHN AND ST. ELIZABETH, 60, Grove End-road, London, N.W.8. Applications are invited from pre-registration or registered medical practitioners (Male) for the appointment of HOUSE PHYSICIAN to become vacant on 22nd December, 1958. Appointment will be for a period of 6 months. National Health Service salary.

Applications to reach the Secretary on or before Friday, 28th November, together with copies of 3 recent testimonials.

HOSPITAL OF ST. JOHN AND ST. ELIZABETH, 60, Grove End-road, London, N.W.8. Applications are invited from pre-registration or registered medical practitioners (Male) for the appointment of HOUSE SURGEON to the Midwifery and Gynæcological Departments to become vacant on 18th December, 1958. Appointment will be for a period of 6 months. National Health Service salary.

Applications to reach the Secretary on or before Friday, 28th November, together with copies of 3 recent testimonials.

LONDON CHEST HOSPITAL. Hospitals for Diseases OF THE CHEST. Applications are invited for the appointment of RESIDENT MEDICAL OFFICER. Appointment for 1 year from 1st January, 1959, and graded as Registrar.

Applications, stating date of birth, qualifications, with dates, and previous appointments held, with copies of 3 testimonials, should be sent to the undersigned not later than 13th November.

J. ROBBINS, House Governor.

London Chest Hospital, E.2.

LONDON HOSPITAL, Whitechapel, E.1. Applications are invited for the post of REGISTRAR to the Neurological Department becoming vacant on 1st January, 1959. A higher qualification, although desirable, is not essential, but experience in general medicine is necessary.

Applications (10 copies), giving the names and addresses of 3 referees, should be received by the undersigned by 15th November, 1958. H. BRIERLEY, House Governor.

METROPOLITAN HOSPITAL, Kingsland-road, London, E.8. (General—146 Beds.) Applications are invited for the pre-registration posts of 2 HOUSE PHYSICIANS, vacant 1st January, 1959.

Applications from provisional and fully registered candidates, stating age, nationality, qualifications and experience, with copies of 3 recent testimonials to the Hospital Secretary by 17th December, 1958.

METROPOLITAN HOSPITAL, Kingsland-road, London, E.8. (General—146 Beds.) Applications are invited for the pre-registration posts of 3 HOUSE SURGEONS, vacant 1st January, 1959.

Applications from provisional and fully registered candidates, stating age, nationality, qualifications and experience, with copies of 3 recent testimonials to the Hospital Secretary by 17th December, 1958.

NORTH EAST METROPOLITAN REGIONAL HOS-PITAL BOARD.

Ilford and Barking Group of Hospitals, Essex (Based on King George Hospital)

REGISTRAR in Obstetrics and Gynæcology. Resident.

North Middlesex Hospital and Annexe, N.18 (125 obstetric and 60 gynæcological beds)

REGISTRAR in Obstetrics and Gynæcology. Recognised for M.R.C.O.G. Resident.

North Middlesex Hospital and Annexes, N.18

REGISTRAR in Thoracic Surgery. Non-resident. Post offers experience in all types of cardiac, œsophageal tuberculosis, and non-tuberculous thoracic surgery.

Black Notley Hospital, Braintree, Essex

SURGICAL REGISTRAR. Resident or non-resident. Recognised for F.R.C.S.

General Hospital, Rochford, Essex (620-Bedded acute hospital)

SURGICAL REGISTRAR. Some duties at other hospitals in Southend-on-Sea Group. Resident or non-resident. Married furnished or unfurnished accommodation available.

General Hospital, Southend-on-Sea

OPHTHALMIC REGISTRAR. Non-resident. Recognised for F.R.C.S. and D.O. Post offers excellent opportunity for gaining clinical and surgical experience in Unit of 25 Beds. Post vacant 18th January, 1959.

Metropolitan Hospital, E.2

ANÆSTHETIC REGISTRAR. Resident.

Harold Wood Hospital, Essex

ANÆSTHETIC REGISTRAR. Resident or non-resident. Recognised for F.F.A. R.C.S.

Appointments subject to review after 1 year.

Application forms from Secretary, 40, Eastbourne-terrace, W.2, to be returned by 22nd November.

NATIONAL HOSPITALS FOR NERVOUS DISEASES. Applications are invited from registered medical practitioners for the appointment of NON-RESIDENT HOUSE PHYSICIAN at The National Hospital, Queen-square, W.C.1, to commence 1st February, 1959. There are 2 vacancies. These posts carry the grade of Senior House Officer. The appointments will be for 6 months.

Applications, with names of 3 referees, to be sent to the undersigned not later than 24th November, 1958.

H. EWART MITCHELL, Secretary to the Board of Governors.
The National Hospitals for Nervous Diseases,
Queen-square, London, W.C.1.

NATIONAL HOSPITALS FOR NERVOUS DISEASES. Applications are invited from registered medical practitioners for the appointment of REGISTRAR (whole-time) to the Lysholm X-ray Department at The National Hospital, Queen-square, London, W.C.1, to commence 1st January, 1959. This post carries the grade of Registrar. Applicants should hold a Diploma in Diagnostic Radiology and have had experience in general radiology. The appointment will be for 6 months in the first instance.

Applications, with names of 3 referees, to be sent to the undersigned not later than 24th November, 1958.

H. EWART MITCHELL, Secretary to the Board of Governors.
The National Hospitals for Nervous Diseases,
Queen-square, London, W.C.1.

NATIONAL HOSPITALS FOR NERVOUS DISEASES. Applications are invited from registered medical practitioners for the appointment of HOUSE SURGEON at The National Hospital, Queen-square, W.C.1, to commence 1st January, 1959. There are 2 vacancies. These posts carry the grade of Registrar. The appointments will be for 6 months in the first instance.

Applications, with names of 3 referees, to be sent to the undersigned not later than 24th November, 1958.

H. EWART MITCHELL, Secretary to the Board of Governors.
The National Hospitals for Nervous Diseases,
Queen-square, London, W.C.1.

NEASDEN HOSPITAL (Acute Infectious Diseases), Brentfield-road, London, N.W.10. SENIOR HOUSE OFFICER, whole-time, resident, required. Now vacant. Hospital offers wide clinical experience and excellent opportunities for post-graduate studies.

Applications to the Physician-Superintendent.

NORTH MIDDLESEX HOSPITAL, London, N.18. ADMISSIONS OFFICER (Senior House Officer grade). 6 months' appointment (with possible extension to 1 year), starting 1st January, 1959. Non-resident. A busy post in a new department. Evenings and weekends (from 1 P.M. Saturday) free.

Applications, giving details of qualifications and experience, together with copies of recent testimonials and/or names of 2 referees, should reach the Secretary of the Hospital not later than 19th November.

NORTH MIDDLESEX HOSPITAL, London, N.18. Casualty OFFICER (Senior House Officer grade). 6 months' appointment, starting 1st January, 1959. Non-resident post, recognised for F.R.C.S. 3 Casualty Officers employed; duties include service with the 3 main surgical units.

Applications, giving details of qualifications and experience, together with copies of recent testimonials and/or names of 2 referees, should reach the Secretary of the Hospital not later than 19th November.

NORTH WEST METROPOLITAN REGIONAL HOS-PITAL BOARD. RESIDENT ANÆSTHETIC REGISTRAR required. 2 years' appointment—first year at Willesden General Hospital, Harlesden-road, N.W.10, second year at Central Middlesex Hospital, Park Royal, N.W.10. Candidates are invited to visit the Hospitals by previous arrangement.

Application forms from, and returnable to, Group Secretary, Central Middlesex Group Hospital Management Committee, Park Royal, London, N.W.10, by 17th November, 1958.

PRINCE OF WALES'S GENERAL HOSPITAL, N.15. Applications are invited for the appointment of RESIDENT JUNIOR HOUSE SURGEON for Casualty (Senior House Officer grade) to the above Hospital for a period of 6 months, vacant 19th December, 1958.

Application form from Secretary, Tottenham Group Hospital Management Committee, The Green, N.15, to be returned by 22nd November, 1958.

PRINCESS BEATRICE HOSPITAL, Earls Court, S.W.5. Applications are invited for the resident post of HOUSE PHYSICIAN (Senior House Officer grade). The appointment is for 6 months from 27th December, 1958, with an opportunity to serve a further 6 months as Obstetric Gynæcological House Officer or Casualty Officer-Anæsthetist in the same grade.

Applications, with 3 testimonials, to the House Governor by 17th November.

QUEEN MARY'S HOSPITAL FOR THE EAST END, Stratford, E.15. HOUSE SURGEON (pre-registration) required for 6 months commencing 2nd January, 1959. Post recognised for F.R.C.S.

Applications, with copies of recent testimonials, to Hospital Secretary by 22nd November, 1958.

QUEEN MARY'S HOSPITAL FOR THE EAST END, Stratford, E.15. SENIOR HOUSE SURGEON (Senior House Officer grade) required for 6 months, commencing 5th December, 1958. Post recognised for F.R.C.S.

Applications, with the names of 3 referees, to Hospital Secretary by 22nd November, 1958.

QUEEN MARY'S HOSPITAL FOR THE EAST END, Stratford, E.15. HOUSE PHYSICIAN (pre-registration) required for 6 months, commencing 2nd January, 1959.

Applications, with copies of recent testimonials, to Hospital Secretary by 22nd November, 1958.

QUEEN MARY'S (ROEHAMPTON) HOSPITAL, London, S.W.15. SENIOR HOUSE OFFICER (orthopædic) required. National Health Service terms and conditions.

Apply Medical Superintendent.

QUEEN MARY'S (ROEHAMPTON) HOSPITAL, London, S.W.15. ORTHOPÆDIC REGISTRAR required whole-time. National Health Service terms and conditions.

Detailed applications (4 copies), giving nationality, date of birth, qualifications, experience, present appointments, and names of 3 referees, should reach the Secretary, Ministry of Health, Division 4(v), Norcross, Blackpool, Lancs, by 28th November, 1958.

ROYAL FREE HOSPITAL GROUP. Applications are invited for 2 posts of MEDICAL REGISTRAR. Candidates should be Members of the Royal College of Physicians. The appointments are for 1 year in the first instance, duties to commence 1st January, 1959.

Application forms may be obtained from the Secretary to the Board of Governors, The Royal Free Hospital, Gray's Inn-road, W.C.1, to whom they should be returned not later than 14th November, 1958.

ROYAL FREE HOSPITAL. Applications are invited from registered medical practitioners for the post of SENIOR CASUALTY OFFICER. The appointment is full time, resident, for 6 months, duties to commence on 1st January, 1959. Salary and conditions of service in accordance with those laid down by the Ministry of Health for Senior House Officers.

Application forms may be obtained from the Secretary to the Board of Governors, The Royal Free Hospital, Gray's Inn-road, W.C.1, to whom they should be returned as soon as possible.

ROYAL FREE HOSPITAL and HEATHERWOOD ORTHOPÆDIC HOSPITAL. (REGIONAL ORTHOPÆDIC CENTRE.) Applications are invited from registered medical practitioners for the post of ORTHOPÆDIC REGISTRAR (non-resident) to work for a maximum period of 1 year at each Hospital, duties to commence on 1st January, 1959.

Application forms may be obtained from the Secretary to the Board of Governors, The Royal Free Hospital, Gray's Inn-road, W.C.1, to whom they should be returned by 12th November, 1958.

ROYAL FREE HOSPITAL, W.C.1, and WHITTINGTON HOSPITAL, N.19. Applications are invited for the post of REGISTRAR to the Departments of Physical Medicine at the Royal Free and Whittington Hospitals. Duties to commence at the Whittington Hospital. Appointment is full-time, non-resident, and for 1 year in the first instance, starting 1st January, 1959.

Applications, with the names of 2 referees, should be made to the Secretary to the Board of Governors, Royal Free Hospital, Gray's Inn-road, W.C.1, by 30th November, 1958.

SOUTH EAST METROPOLITAN REGIONAL HOS-PITAL BOARD. Applications are invited for a whole-time appointment as RESIDENT SURGICAL OFFICER to fill a vacancy in the Greenwich and Deptford Group of hospitals, for duties mainly at St. Alfege's Hospital, Vanbrugh Hill, S.E.10. The post is recognised for the F.R.C.S. examination. The salary will be £1061 10s. p.a., and the appointment will be in accordance with the terms and conditions of service of hospital medical and dental staff (England and Wales), and will be for 1 year in the first instance, renewable for a further year.

Applications, giving particulars of age, qualifications and experience, with relevant dates, together with the names and addresses of 2 referees, to be sent to the Secretary, Registrars Committee, South East Metropolitan Regional Hospital Board, 40, Eastbourne-terrace, London, W.2, not later than 22nd November, 1958.

SOUTH EAST METROPOLITAN REGIONAL HOS-PITAL BOARD. Applications are invited for an appointment as Whole-time REGISTRAR in General Medicine to fill a vacancy in the Lewisham Group of hospitals. The appointment will be in accordance with the terms and conditions of service of hospital medical and dental staff (England and Wales), and will be for 1 year in the first instance.

Applications, giving particulars of age, qualifications and experience, with relevant dates, together with the names and addresses of 2 referees, to be sent to the Secretary, Registrars Committee, South East Metropolitan Regional Hospital Board, 40, Eastbourne-terrace, W.2, not later than 22nd November, 1958.

SOUTH EAST METROPOLITAN REGIONAL HOS-PITAL BOARD. Applications are invited for an appointment as Whole-time SENIOR REGISTRAR in Obstetrics and Gynæcology to fill a vacancy in the Lewisham Group of hospitals. There are 64 obstetric and 67 gynæcological beds in the Group. Candidates should have had considerable experience in obstetrics and gynæcology and should possess the M.R.C.O.G. qualification. The appointment will be in accordance with the terms and conditions of service of hospital medical and dental staff (England and Wales), and will be for 1 year in the first instance.

Applications, giving particulars of age, qualifications and experience, with relevant dates, together with the names and addresses of 3 referees, to be sent to the Secretary, Registrars Committee, South East Metropolitan Regional Hospital Board, 40, Eastbourne-terrace, W.2, by not later than 22nd November, 1958.

ST. JAMES' HOSPITAL, Balham, S.W.12. Locum ANÆSTHETIC REGISTRAR required from 16th November until permanent appointment made.

Applications, stating age, qualifications and experience, with copies of 2 testimonials, to Group Secretary at above address.

ST. OLAVE'S HOSPITAL, Lower-road, London, S.E.16. BERMONDSEY AND SOUTHWARK GROUP HOSPITAL MANAGEMENT COMMITTEE. A vacancy for HOUSE PHYSICIAN, pre-registration post, will occur on 1st December, 1958, at above Hospital. The position is tenable for 6 months.

Applications, with full details and names of 2 referees, to the Secretary at the above address within 1 week of advertisement.

ST. STEPHEN'S HOSPITAL, Chelsea, S.W.10. House PHYSICIAN for duty in Rheumatism Unit, resident. This post offers valuable experience in general medicine and specialised experience in rheumatic and connective tissue diseases, and is very suitable for candidates wishing to take membership. Vacancy 23rd December.

Applications, naming 2 referees, to Medical Superintendent.

ST. THOMAS'S HOSPITAL, London, S.E.1. Resident ASSISTANT PHYSICIAN (Senior Registrar grade). For a period of 1 year in the first instance from 15th February, 1959. Renewable for a second year.

Applications, naming 2 referees, to Clerk of the Governors by 15th November, 1958.

SOUTH LONDON HOSPITAL FOR WOMEN AND CHILDREN, Clapham Common, S.W.4. Applications are invited from pre-registration and registered Female medical practitioners for the appointment of OBSTETRIC HOUSE SURGEON. Recognised for the M.R.C.O.G. Appointment for 6 months from 29th January, 1959.

Forms of application from Hospital Secretary.

SOUTH WEST METROPOLITAN REGIONAL HOS-PITAL BOARD. REGISTRAR in Obstetrics and Gynæcology. Duties at Nelson Hospital, Merton, S.W.20 (6 sessions), and St. Teresa's Maternity Hospital, Wimbledon (5 sessions). Post vacant 1st January, 1959.

Application forms, obtainable from the Group Secretary, St. Helier Hospital, Carshalton, Surrey, to be returned not later than 22nd November.

WANSTEAD HOSPITAL, London, E.11. (191 Beds.) (63 acute medical and 7 pædiatric medical beds.) HOUSE PHYSICIAN required. Pre- or post-registration candidates eligible. Post offers wide experience in general medicine.

Applications, with full details and copies of 2 recent testimonials, should be sent immediately to Secretary, Forest Group Hospital Management Committee, Langthorne-road, E.11.

WHIPPS CROSS HOSPITAL, London, E.11. Leytonstone (NO. 10) HOSPITAL GROUP. Applications are invited for the post of HOUSE PHYSICIAN (pre- or post-registration) (general medicine), at above Hospital. This post becomes vacant 1st January, 1959.

Application forms obtainable from and returnable to the Hospital Secretary by 17th November, 1958.

WHIPPS CROSS HOSPITAL, London, E.11. Leytonstone (NO. 10) HOSPITAL GROUP. Applications are invited for 3 posts of pre-registration HOUSE PHYSICIAN (general medicine) at above Hospital. All 3 posts become vacant 1st January, 1959.

Application forms obtainable from and returnable to the Hospital Secretary by 17th November, 1958.

WHIPPS CROSS HOSPITAL, London, E.11. Leytonstone (NO. 10) HOSPITAL GROUP. Applications are invited for 3 posts of Pre-registration HOUSE SURGEON (general surgery) at above Hospital. All 3 posts become vacant 1st January, 1959.

Application forms obtainable from and returnable to the Hospital Secretary by 17th November, 1958.

WHIPPS CROSS HOSPITAL, London, E.11. Leytonstone (NO. 10) HOSPITAL GROUP. Applications are invited for the post of HOUSE SURGEON (post- or pre-registration) in the Orthopædic Department at above Hospital. This post, which is recognised for the F.R.C.S., becomes vacant 31st December, 1958.

Application forms obtainable from and returnable to the Hospital Secretary by 17th November, 1958.

WHIPPS CROSS HOSPITAL, London, E.11. Leytonstone (NO. 10) HOSPITAL GROUP. Applications are invited for the post of Pre-registration HOUSE SURGEON for the Gynæcology and Urology Departments at above Hospital. This post becomes vacant 1st January, 1959.

Application forms obtainable from and returnable to the Hospital Secretary by 17th November, 1958.

WILLESDEN GENERAL HOSPITAL, Harlesden-road, N.W.10. Locum ANÆSTHETIC REGISTRAR required.

Applications to Hospital Secretary.

ABERYSTWYTH, CARDIGANSHIRE. GENERAL HOS-PITAL. MID-WALES HOSPITAL MANAGEMENT COMMITTEE. HOUSE OFFICER (surgical) required (resident). Post recognised for F.R.C.S. examination. Vacancy immediate.

Applications, stating age, experience, &c., to the Group Secretary, Mid-Wales Hospital Management Committee, 31, North-parade, Aberystwyth, Cardiganshire.

AMERSHAM GENERAL HOSPITAL, Buckinghamshire. RESIDENT HOUSE PHYSICIAN required for General Medicine and Geriatrics.

Apply, with names of 2 referees, to Hospital Secretary.

ASCOT, BERKSHIRE. HEATHERWOOD ORTHO-PÆDIC HOSPITAL. Locum REGISTRAR (orthopædics) required for 1 week from 10th November.

Applications, giving full details and names of 2 referees, to Secretary.

AYLESBURY, BUCKINGHAMSHIRE. STOKE MANDE-VILLE HOSPITAL. RESIDENT HOUSE PHYSICIAN required for the Department of General Medicine. Recognised pre-registration post, but applications from registered practitioners also considered. Post vacant mid-December. Interviews 28th November.

Applications, with copies of 2 testimonials, to Administrative Officer, by 20th November.

BARNSTAPLE. NORTH DEVON INFIRMARY. (105 Beds.) HOUSE PHYSICIAN (pre-registration) required immediately.

Applications, naming 2 referees, to Group Secretary, North Devon Hospital Management Committee, 19, Alexandra-road, Barnstaple.

BEVERLEY, YORKSHIRE. BROADGATE MENTAL HOSPITAL. JUNIOR HOSPITAL MEDICAL OFFICER. Accommodation for married man available. Opportunity given for study and attendance at courses in Leeds.

Applications, giving details of present appointment, experience, and names of referees, to Group Secretary, Westwood Hospital, Beverley.

BEVERLEY, YORKSHIRE. WESTWOOD HOSPITAL. ASSISTANT PATHOLOGIST (Senior House Officer grade) required for Area Laboratory. Offers experience in all branches of pathology.

Detailed applications to Group Secretary.

BEBINGTON, WIRRAL, CHESHIRE. CLATTERBRIDGE HOSPITAL. CENTRAL WIRRAL GROUP. SENIOR HOUSE OFFICER (anæsthetics) required to fill vacancy for a 12-month period. Salary in accordance with current terms and conditions of service.

Application forms, obtainable from Secretary, to be returned immediately.

BEBINGTON, WIRRAL, CHESHIRE. CLATTERBRIDGE HOSPITAL WEST. CENTRAL WIRRAL GROUP. Applications are invited for the resident post of JUNIOR HOSPITAL MEDICAL OFFICER in the 63-Bed radiotherapy wing of the above Hospital. Supervoltage equipment will be used and valuable experience will be obtainable for those contemplating specialising in radiotherapy. Whitley Council conditions of service. Salary £852 10s.–£1182 10s.

Apply on forms from Secretary by 18th November, 1958.

BEDFORD GENERAL HOSPITAL. (424 Beds.) House SURGEON required. Pre- or post-registration, recognised for F.R.C.S. Post offers exceptional opportunities for general experience in busy acute surgical units. Holder of this appointment will be favourably considered for appointment as House Physician at the termination of contract.

Applications, with copies of 2 recent testimonials, to Group Secretary, Bedford Group Hospital Management Committee, 3, Kimbolton-road, Bedford.

BEDFORD GENERAL HOSPITAL. (424 Beds.) Resident HOUSE SURGEON (gynæcology and obstetrics). Vacant mid-December. Post recognised for D.Obst.R.C.O.G. The Maternity Unit comprises 71 obstetric and 23 gynæcological beds, and the Hospital has a busy Outpatient Department.

Detailed applications, wit' copies of 2 recent testimonials, to Group Secretary, Bedford Group Hospital Management Committee, 3, Kimbolton-road, Bedford, by 13th November.

BEXLEY HOSPITAL, Dartford Heath, Bexley, Kent. BEXLEY HOSPITAL MANAGEMENT COMMITTEE. Applications invited for appointment as SENIOR HOUSE OFFICER at above Hospital. Salary £819 10s. p.a. with deduction of £150 p.a. for board, lodging, &c., if resident. The Hospital (2300 Beds) deals with all types of psychiatric illness, and experience in all modern physical, occupational, and psychotherapeutic procedures is available. Opportunities will also be available to assist at Outpatient Clinics.

Applications, with names and addresses of 3 referees, should be sent to the Physician-Superintendent, Dr. M. RADZAN, M.B., B.S., M.R.C.S., L.R.C.P., D.P.M., within 14 days of the appearance of this advertisement.

BIRMINGHAM REGIONAL HOSPITAL BOARD.

(1) **Birmingham (Dudley Road) Group, Dudley Road Hospital, Birmingham, 18**

(*a*) REGISTRAR (E.N.T. surgery). Non-resident. Approximately 40 E.N.T. beds. Post recognised for D.L.O. Experience specialty and higher qualifications an advantage.

(*b*) REGISTRAR (anæsthetics). New appointment. Recognised for F.F.A. R.C.S. Duties at Dudley Road Hospital and other Group Hospitals. Possession of D.A. desirable.

(2) **Shrewsbury Group, Royal Salop Infirmary, Shrewsbury**

REGISTRAR (obstetrics and gynæcology). Royal Salop Infirmary Copthorne Hospital. Considerable clinical responsibility. House Surgeon posts (only) recognised for M.R.C.O.G. Vacant 23rd December, 1958.

Application forms from Group Secretaries, to be returned by 17th November, 1958.

BIRMINGHAM. THE UNITED BIRMINGHAM HOSPITALS. THE CHILDREN'S HOSPITAL, Ladywood-road, BIRMINGHAM, 16. HOUSE OFFICERS (surgical) required, to commence duty on 7th January, 1959, for 6 months. The posts rotate during the period, giving good experience of general and special surgery. Recognised for pre-registration students, but registered practitioners may apply.

Forms of application available from the House Governor, and should be returned to him by 22nd November, 1958.

G. A. PHALP, Secretary to the Board of Governors.

BIRMINGHAM. THE UNITED BIRMINGHAM HOSPITALS. THE CHILDREN'S HOSPITAL, Ladywood-road, BIRMINGHAM, 16. Applications are invited for the post of ASSISTANT RESIDENT MEDICAL OFFICER, vacant 7th January, 1959, for 6 months to take charge of Infants Block (66 Cots), followed by 6 months as Resident Medical Officer in charge of the main wards. Valuable opportunity for further study of disease of infancy, some previous experience of which is desirable, M.R.C.P. preferred. Both posts Senior House Officer grade.

Forms of application available from the House Governor and should be returned to him by 22nd November, 1958.

G. A. PHALP, Secretary to the Board of Governors.

BIRMINGHAM. THE UNITED BIRMINGHAM HOSPITALS. QUEEN ELIZABETH HOSPITAL. Applications are invited for the post of MEDICAL REGISTRAR (Senior Registrar grade). The appointment is subject to annual review and the successful candidate may subsequently be required to spend not more than 2 years in a selected Hospital of the Birmingham Regional Hospital Board, in accordance with the arrangements for the interchange of Registrars agreed between the 2 Boards. The successful candidate may be required to be resident.

Forms of application may be obtained from, and should be returned to, the Secretary, United Birmingham Hospitals, Queen Elizabeth Hospital, Edgbaston, Birmingham, 15, not later than 29th November, 1958.

BIRMINGHAM. UNITED BIRMINGHAM HOSPITALS. THE BIRMINGHAM AND MIDLAND HOSPITAL FOR WOMEN, Showell Green-lane, SPARKHILL, BIRMINGHAM, 11. 2 RESIDENT GYNÆCOLOGICAL HOUSE SURGEONS—pre-registration or otherwise—required for duty 7th January, 1959. Recognised for M.R.C.O.G.

Application forms obtainable from House Governor at above address, to be returned not later than 29th November, 1958.

G. A. PHALP, Secretary.

BIRMINGHAM ACCIDENT HOSPITAL, Bath-row, BIRMINGHAM, 15. (215 Beds and 8 House Surgeons.) HOUSE SURGEONS (resident) required from December onwards. Hospital treats over 50,000 injured patients each year, and is recognised for purpose of casualty training by R.C.S. (Eng.). 6-month appointment, part of which may be spent in 42-bedded segregated Burns Unit.

Apply, naming 2 referees, to Administrator.

BISHOP AUCKLAND. THE GENERAL HOSPITAL. HOUSE OFFICER (obstetrics and gynæcology). Applications invited from registered or pre-registration practitioners. Vacant 1st January, 1959. Recognised for D.Obst.R.C.O.G. Departmental beds 69.

Apply, naming 2 referees, to Group Secretary, South West Durham Hospital Management Committee, at above address.

BISHOP'S STORTFORD AND DISTRICT HOSPITAL, Rye-street, BISHOP'S STORTFORD, HERTFORDSHIRE. (67 Beds—medical, surgical, and maternity.) Applications are invited from registered medical practitioners for the post of RESIDENT SENIOR HOUSE OFFICER (Male). Salary £819 10s. p.a., less £150 for residential emoluments. To commence 12th December, 1958.

Applications, stating age, nationality, qualifications and experience, with copies of recent testimonials or names of referees, to Hospital Secretary, Herts and Essex General Hospital, Bishop's Stortford, Herts.

BISHOP'S STORTFORD, HERTFORDSHIRE. HERTS AND ESSEX GENERAL HOSPITAL. (341 Beds.) SENIOR HOUSE OFFICER in Obstetrics and Gynæcology (Male or Female) to commence 30th December, 1958, for period of 12 months. Recognised post for D.Obst.R.C.O.G. Duties primarily with Obstetric Department (32 Beds) and Neonatal Nursery and approximately 15 gynæcological beds. Salary £819 10s. p.a., less £150 for resident facilities.

Applications, stating qualifications, nationality, age and experience, with copies of testimonials or names of 2 referees, to Hospital Secretary.

BLACKBURN AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. JUNIOR HOSPITAL MEDICAL OFFICER required immediately for established Geriatric Department under control of Consultant Geriatrician. There are 360 geriatric beds at Queen's Park Hospital, Blackburn, Springfield Hospital, Blackburn, and Clitheroe Hospital, Clitheroe. Accommodation for married man may be available if required.

Applications, with names and addresses of 2 referees, to Group Secretary, Hospital Management Committee Office, Royal Infirmary, Blackburn.

BLACKPOOL VICTORIA HOSPITAL. (354 Beds.) HOUSE SURGEON. Resident pre-registration post available from mid-November, 1958, in the Department of Surgery at this well-equipped Hospital with excellent facilities for gaining experience. Recognised for F.R.C.S.

Applications, stating age, experience, and the names and addresses of 2 referees, should be sent to the Hospital Secretary.

BLACKPOOL VICTORIA HOSPITAL. (354 Beds.) HOUSE OFFICER (orthopædic and traumatic surgery). Resident pre-registration post recognised for F.R.C.S. available from mid-November, 1958, in the main acute General Hospital serving the Blackpool and Fylde area.

Applications, stating age, experience, and giving the names and addresses of 2 referees, should be sent to the Hospital Secretary.

BLACKPOOL VICTORIA HOSPITAL. (354 Beds.) SENIOR HOUSE OFFICER (anæsthetics). Post recognised for F.F.A. R.C.S. and D.A. and vacant mid-November. This is a busy general hospital offering a sound and varied experience in anæsthetics.

Applications, giving age, qualifications, experience, and the names and addresses of 2 referees, should be sent to the Hospital Secretary.

BLACKPOOL. VICTORIA HOSPITAL. Blackpool and FYLDE HOSPITAL MANAGEMENT COMMITTEE. MANCHESTER REGIONAL HOSPITAL BOARD. Applications are invited for the post of REGISTRAR in the Department of Diagnostic Radiology at the above Hospital which is recognised for the D.M.R.D. Part II. The post offers wide experience in all aspects of the work of a busy hospital group, including that of thoracic surgery, the Hospital being the Centre for this specialty for the northern part of the Manchester Region.

The Department may be visited by arrangement with the Group Secretary, Victoria Hospital, Blackpool, to whom applications, stating age, qualifications, experience, and the names and addresses of 2 referees, should be sent.

BOURNEMOUTH. ROYAL VICTORIA HOSPITAL, Shelley-road. BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of SENIOR HOUSE OFFICER (general surgery) for a period of 3½ months, to commence 21st December, 1958. The post, which is resident, is recognised for the F.R.C.S. examination.

Applications to the Hospital Secretary.

BOURNEMOUTH. ROYAL VICTORIA HOSPITAL, Shelley-road. BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of HOUSE SURGEON (general surgery). The appointment, which becomes vacant on 1st December, 1958, is recognised for the F.R.C.S. examination and for pre-registration purposes.

Applications to the Hospital Secretary.

BOURNEMOUTH. ROYAL VICTORIA HOSPITAL, Shelley-road. BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of 3 SENIOR HOUSE OFFICERS (orthopædics and casualty). These appointments, which become vacant on 1st December and 21st December, 1958, and 18th January, 1959, are recognised for the F.R.C.S. examination. The Unit now consists of 3 Senior House Officers and a Registrar.

Applications to the Hospital Secretary.

BOURNEMOUTH (near). CHRISTCHURCH HOSPITAL, CHRISTCHURCH, HAMPSHIRE. (334 Beds.) BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of HOUSE PHYSICIAN (pre-registration intern). The post becomes vacant on 11th December, 1958.

Applications to the Hospital Secretary.

BOURNEMOUTH (near). CHRISTCHURCH HOSPITAL, CHRISTCHURCH, HAMPSHIRE. (334 Beds.) BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. Locum HOUSE PHYSICIAN required 30th December, 1958–12th January, 1959 (inclusive).

Applications to the Hospital Secretary.

BOURNEMOUTH (near). CHRISTCHURCH HOSPITAL, CHRISTCHURCH, HAMPSHIRE. (334 Beds.) BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of HOUSE SURGEON (pre-registration intern). The post becomes vacant on 11th December, 1958.

Applications to the Hospital Secretary.

BRADFORD CHILDREN'S HOSPITAL, Yorkshire. Senior HOUSE OFFICER (Male or Female), vacant 9th December, 1958. Recognised for D.C.H.

Applications, stating age, nationality, qualifications and experience with copy testimonials, to Secretary, Bradford Royal Infirmary, Bradford, Yorks.

BRECHIN, ANGUS. STRACATHRO HOSPITAL. (648 Beds.) Applications are invited from medical practitioners of at least 18 months' standing for the post of SENIOR HOUSE OFFICER to the area Geriatric Unit at Stracathro Hospital and Brechin Infirmary. The Unit, comprising some 140 Beds, undertakes active treatment and rehabilitation under the direction of the Regional Consultant in Geriatrics. Salary £819 10s. p.a., less £150 for residential emoluments.

Applications, accompanied by 3 recent testimonials, or naming 3 referees, should be addressed to the Group Medical Superintendent at Stracathro Hospital.

BRIGHTON GENERAL HOSPITAL. Applications are invited for the pre-registration appointment of HOUSE SURGEON (orthopædics).

Applications, stating age, qualifications, and the names of 2 referees, should be sent to the Physician-Superintendent, Brighton General Hospital, Elm-grove, Brighton.

BRIGHTON. ROYAL SUSSEX COUNTY HOSPITAL. (314 Beds.)

HOUSE SURGEON required mid-November.

2 CASUALTY HOUSE SURGEONS required beginning and end December. Full and varied experience in busy Casualty Department (staff of 3), and also duties in Orthopædic and Traumatic Unit, including charge of beds.

All posts recognised for pre-registration and F.R.C.S.

Applications, stating age, qualifications, experience, and naming 2 referees, to the Administrative Officer, Royal Sussex County Hospital, Brighton, 7.

BRIGHTON. ROYAL SUSSEX COUNTY HOSPITAL. SENIOR CASUALTY OFFICER (Junior Hospital Medical Officer grade) required for busy Casualty Department (2 junior medical staff). Vacant early November. Recognised for F.R.C.S.

Applications, stating age, qualifications and experience, together with the names of 2 referees, to the Administrative Officer.

BRISTOL. COSSHAM AND FRENCHAY HOSPITAL MANAGEMENT COMMITTEE. FRENCHAY HOSPITAL. SENIOR HOUSE OFFICER, Regional Department of Neurosurgery. Vacant immediately, tenable for 6–12 months. The post offers useful surgical experience and the opportunity of gaining a working knowledge of neurological diagnosis. Recognised for F.R.C.S.

Applications to Group Secretary, Frenchay Hospital, quoting "N.S.F." Names of 2 referees required.

BRISTOL. STOKE PARK GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for an appointment as a JUNIOR HOSPITAL MEDICAL OFFICER in the above Group of mental deficiency hospitals (1796 Beds). A genuine interest in the problems of the mentally defective is essential in these progressive hospitals pursuing an active programme of rehabilitation. Lecture-demonstrations are given at the Hospital as part of the postgraduate D.P.M. course organised by the University of Bristol, and the successful candidate will be encouraged to take the D.P.M. Small furnished flat available for single person. Salary £852 10s., rising by £55 to £1182 10s. p.a.

Applications, giving full personal particulars, qualifications and experience, together with names and addresses of 2 referees, to the Medical Superintendent, Stoke Park Hospital, Stapleton, Bristol, as soon as possible.

BURNLEY VICTORIA HOSPITAL. (171 Beds.) Resident HOUSE OFFICER (surgical). The appointment is approved as a pre-registration post and recognised for F.R.C.S. Subject to satisfactory service, the successful applicant will be favourably considered for appointment as House Physician at the termination of contract as Surgical House Officer.

Applications, with 2 references, to Group Secretary, Burnley and District Hospital Management Committee, Burnley General Hospital.

BURTON-ON-TRENT GENERAL HOSPITAL. (251 Beds.) ANÆSTHETIST (Junior Hospital Medical Officer grade). Busy general base hospital for area. 8 residents. Excellent experience. Recognised for D.A. Married or single accommodation, furnished or unfurnished, as required.

Applications to Group Secretary, General Hospital, Burton-on-Trent, Staffordshire.

BURTON-ON-TRENT GENERAL HOSPITAL. (251 Beds.) CASUALTY OFFICER (Senior House Officer grade). Busy general base hospital for area. 8 residents. Full Consultant service. Excellent experience. Recognised for F.R.C.S. Married accommodation, furnished or unfurnished, available.

Applications to Group Secretary, General Hospital, Burton-on-Trent, Staffordshire.

BURTON-ON-TRENT GENERAL HOSPITAL. (251 Beds.) HOUSE SURGEONS (general), pre-registration. Busy general base hospital for area. 8 residents. Full Consultant service. Excellent experience. Recognised for F.R.C.S. Married accommodation will be available for a joint post.

Applications to Group Secretary, General Hospital, Burton-on-Trent, Staffordshire.

BURTON-ON-TRENT. THE GENERAL HOSPITAL. HOUSE OFFICER (orthopædics) (pre-registration post) required at the above Hospital. Recognised for F.R.C.S.

Applications to Group Secretary as soon as possible.

CANTERBURY. KENT AND CANTERBURY HOSPITAL. (277 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER (pathology) (non-resident), which is now vacant. The post is for 1 year. Salary £819 10s. p.a., with National Health Service conditions. Experience in pathology not essential, but candidates must have had previous clinical experience.

Applications, stating age, qualifications, together with copies of 2 recent testimonials, to be addressed to the Hospital Secretary at the above Hospital.

CARDIFF (near). PRINCE OF WALES ORTHOPÆDIC HOSPITAL, RHYDLAFAR, near CARDIFF. SENIOR HOUSE OFFICER required at above Hospital. Married or single accommodation available.

Form of application from Group Secretary, Cardiff Hospital Management Committee, 44, Cathedral-road, Cardiff.

CARDIFF. ST. DAVID'S HOSPITAL. Senior House OFFICER (resident) required in Geriatric Unit (200 Beds) at above Hospital.

Form of application from Group Secretary, Cardiff Hospital Management Committee, 44, Cathedral-road, Cardiff.

CARDIFF. THE UNITED CARDIFF HOSPITALS. Applications are invited for the post of REGISTRAR to the Professorial Surgical Unit at the Cardiff Royal Infirmary, to commence January, 1959.

Application forms are available from the Secretary to the Board at the Cardiff Royal Infirmary, Newport-road, Cardiff, and should be returned within 14 days of the appearance of this advertisement.

CARDIFF. UNITED CARDIFF HOSPITALS AND THE WELSH REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of SENIOR REGISTRAR in Neurosurgery to commence duty as soon as possible. The successful candidate will be based in the United Cardiff Hospitals initially, but will be expected to spend 2 years of the appointment in a Regional Hospital Board centre.

Application forms are available from the Secretary to the Board, United Cardiff Hospitals, Cardiff Royal Infirmary, Newport-road, Cardiff, and should be returned within 14 days of the appearance of this advertisement.

CARSHALTON, SURREY. ST. HELIER HOSPITAL. (733 Beds.) 2 HOUSE SURGEONS required on Surgical Unit of 78 Beds. Posts recognised for F.R.C.S. examination and approved for pre-registration experience. Vacant early December.

Applications, giving age, qualifications, &c., with copies of recent testimonials or the names and addresses of 2 referees, should be sent to the Secretary at above address.

CARSHALTON, SURREY. ST. HELIER HOSPITAL. (733 Beds.) HOUSE SURGEON (approved for pre-registration service). General surgery with duties in E.N.T. Vacant early December.

Applications, giving age, qualifications, &c., with copies of recent testimonials or the names and addresses of 2 referees, should be sent to the Secretary at above address.

CHEDDLETON, near LEEK, STAFFORDSHIRE. ST. EDWARD'S HOSPITAL. JUNIOR HOSPITAL MEDICAL OFFICER. Previous mental hospital experience not essential. This Hospital offers opportunities for gaining experience in all branches of psychiatry. Terms and conditions of service will be as approved for hospital medical staff employed in the National Health Service. Salary £852–£55–£1182 p.a. Single furnished quarters, or unfurnished house on Hospital estate available for a married man.

Applications as soon as possible to the Medical Superintendent.

CHELTENHAM GROUP HOSPITAL MANAGEMENT COMMITTEE. Rotating Internship. A vacancy occurs for a HOUSE SURGEON, pre- or post-registration, at the Cheltenham General Hospital. The successful candidate on completion of his 6 months will be offered the post of House Physician, followed by that of Resident Obstetric Officer in the Group, if desired.

Applications, stating age and experience and names of 2 referees, to be sent to the Group Secretary, General Hospital, Cheltenham.

CHELMSFORD. ST. JOHN'S HOSPITAL. (65 surgical beds.) Applications are invited for the appointment of RESIDENT SURGICAL OFFICER (Senior House Officer grade). The post, which becomes vacant on 6th December, 1958, is recognised for the F.R.C.S., and the successful candidate will gain excellent experience in general surgery, with good opportunity for preparation for higher qualifications. A House Surgeon is in residence.

Applications, stating age, nationality, qualifications and experience, with dates, together with recent testimonials, to be received not later than 17th November, 1958, by the Group Secretary, Chelmsford Group Hospital Management Committee, Chelmsford and Essex Hospital, London-road, Chelmsford.

CHELMSFORD. ST. JOHN'S HOSPITAL. House SURGEON (pre-registration, first or second post). To commence 1st December, 1958. The Hospital deals with a large number of routine and emergency cases. Recognised for training for the Fellowship of the Royal College of Surgeons.

Applications, stating age, nationality, qualifications and experience, together with copies of recent testimonials, should be received not later than 18th November, by the Group Secretary, Chelmsford Group Hospital Management Committee, London-road, Chelmsford.

CHELMSFORD. ST. JOHN'S HOSPITAL. House PHYSICIAN (pre-registration, first, second, or third appointment). (Male or Female.) To commence 1st December, 1958.

Applications, stating age, nationality, qualifications and experience, together with copies of recent testimonials, should be received not later than 18th November by the Group Secretary, Chelmsford Hospital Management Committee, Chelmsford and Essex Hospital, London-road, Chelmsford.

CHELMSFORD AND ESSEX HOSPITAL. (161 Beds.) Applications are invited for the post of RESIDENT HOUSE SURGEON. Pre-registration post. The post will become vacant at the end of November, and offers good surgical experience. Recognised for the F.R.C.S.

Applications, together with 2 recent testimonials, to the Secretary, Chelmsford Hospital Management Committee, London-road, Chelmsford.

CHELMSFORD AND ESSEX HOSPITAL. (161 Beds.) Applications are invited for the post of RESIDENT HOUSE PHYSICIAN, pre-registration post, to work in the general medical wards of the Hospital. Duties will commence on 13th December.

Applications, together with 2 recent testimonials, to the Secretary, Chelmsford Hospital Management Committee, London-road, Chelmsford.

CHERTSEY, SURREY. ST. PETER'S HOSPITAL (late Botley's Park War Hospital). (430 Beds.) ORTHOPÆDIC HOUSE SURGEON (Senior House Officer or House Officer (Intern) grade). 100 orthopædic beds. Post recognised for F.R.C.S. and pre-registration service. Salary in accordance with terms and conditions of National Health Service. Post vacant 26th November, 1958.

Applications, together with names and addresses of referees, to be sent to the Physician-Superintendent, St. Peter's Hospital, Chertsey, Surrey.

CHESTERFIELD HOSPITAL MANAGEMENT COMMITTEE. JUNIOR HOSPITAL MEDICAL OFFICER required at Whittington Hall, Chesterfield (356 Beds for female mentally deficient patients), and Scarsdale Hospital, Chesterfield, where there are 125 Beds for mental patients. Previous experience advantageous but not essential. Post offers ample opportunities for study. Small flat available within the Group if required.

Please apply, with names of 2 referees, to the Group Secretary at the Chesterfield Royal Hospital.

CHORLEY AND DISTRICT HOSPITAL, Chorley. (80 acute beds.) Locum SENIOR HOUSE OFFICER in Surgery required for the month of January, 1959.

Applications, with names of 2 referees, to the Group Secretary, Preston and Chorley Hospital Management Committee, Royal Infirmary, Preston, Lancs.

COLCHESTER GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications invited for :—

Essex County Hospital, Colchester, Essex (181 Beds)

Post of SENIOR HOUSE OFFICER to Casualty and Radiotherapy Departments. Tenable for 6 months or 1 year. Recognised for F.R.C.S.

Clacton and District Hospital, Clacton-on-Sea Essex (58 Beds).

Post of SENIOR HOUSE OFFICER. Duties include medical, surgical, and casualty work. Post tenable for 6 months or 1 year.

Applications, with copies of 3 testimonials, to Group Secretary, Colchester Hospital Management Committee, 14, Pope's-lane, Colchester, Essex.

DONCASTER. WESTERN HOSPITAL. Applications are invited from registered medical practitioners for the appointment of RESIDENT MEDICAL OFFICER in the grade of Junior Hospital Medical Officer.

Applications, stating age, qualifications and experience, together with copies of 3 recent testimonials, should be forwarded to the Group Secretary, Doncaster Hospital Management Committee, Doncaster Royal Infirmary.

DORCHESTER. DORSET COUNTY HOSPITAL. House SURGEON (Male or Female) required for resident, pre-registration post now vacant. Recognised for F.R.C.S. examination and tenable for 6 months.

Applications, stating age, qualifications, together with copy testimonials, to Group Secretary, West Dorset Hospital Management Committee, Damers-road, Dorchester, Dorset, immediately.

DUDLEY, STOURBRIDGE AND DISTRICT HOSPITAL GROUP, BIRMINGHAM REGION.

The Guest Hospital, Dudley (154 Beds)

SENIOR HOUSE OFFICER (anæsthetics). Post recognised for F.F.A. R.C.S. and D.A. Successful candidate will be required to visit other hospitals in the Group.

Applications, giving the names of 2 referees, to the Group Secretary, Guest Hospital, Dudley, Worcs.

HOUSE OFFICER (surgical), pre-registration. Post vacant now.

Wordsley Hospital, near Stourbridge (478 Beds)

SENIOR HOUSE OFFICER (surgical). Post now vacant.

HOUSE OFFICER (surgical), pre-registration. Post now vacant.

Apply Group Secretary, Guest Hospital, Dudley, Worcs.

DUMFRIES AND GALLOWAY ROYAL INFIRMARY. SENIOR HOUSE OFFICER in Anæsthetics required at above Infirmary, which is recognised as a Training Hospital for the D.A.

Applications, with particulars of posts previously held, to be sent to Secretary, Dumfries and Galloway Royal Infirmary, Dumfries.

EDGWARE GENERAL HOSPITAL, Edgware, Middlesex. (647 Beds.) RESIDENT HOUSE SURGEON (general and genito-urinary) for above Hospital. Post vacant 16th November, 1958. 6 months' appointment. Post recognised for F.R.C.S. and pre-registration purposes.

Applications, stating age, qualifications and experience, and enclosing copies of up to 3 recent testimonials, to Medical Administrator of Hospital immediately.

EAST ANGLIAN REGIONAL HOSPITAL BOARD.

SURGICAL REGISTRAR, United Norwich Hospitals. Main duties at West Norwich Hospital with outpatient clinics at Norfolk and Norwich Hospital. Recognised for F.R.C.S. Candidates invited to visit by direct arrangement with Hospital Management Committee Secretary, Norfolk and Norwich Hospital, Norwich.

REGISTRAR in Ophthalmology, Norfolk and Norwich Hospital, Norwich (441 Beds). Recognised for D.O. and F.R.C.S. Candidates invited to visit Hospital by direct arrangement with Hospital Management Committee Secretary, at the Hospital.

REGISTRAR in Mental Deficiency and Child Psychiatry, Little Plumstead (near Norwich) Mental Deficiency Group of hospitals and Child Psychiatry Service. The Group (1150 Beds), which is progressive and the centre for much outpatient work including child psychiatry clinics, is recognised as a training centre for the D.P.M. by the Conjoint Board for 1 year. Comfortable flat (furnished or unfurnished available). Candidates invited to visit hospitals by direct arrangement with Medical Superintendent.

Appointments for 1 year, renewable for second year.

Applications, stating age, experience, and the names of 3 referees, to Board's Senior Administrative Medical Officer, 117, Chesterton-road, Cambridge, by 24th November, 1958.

EPPING. ST. MARGARET'S HOSPITAL. Resident HOUSE PHYSICIAN required from 17th November, 1958. Duties relating mainly to general medicine and children.

Applications immediately, with copies of 2 recent testimonials, to the Group Secretary, Epping Group Hospital Management Committee, Oak Cottage, The Plain, Epping, Essex.

EXETER. ROYAL DEVON AND EXETER HOSPITAL. Applications are invited from pre-registration and registered medical practitioners for 2 posts of HOUSE SURGEON in General Surgery—vacant 1st December, 1958.

Applications, with copies of 2 recent testimonials or the names of 2 referees, to the Hospital Secretary by 15th November, 1958.

FARNBOROUGH HOSPITAL, Kent. (800 Beds.) House SURGEON required 15th December. Excellent experience in general surgery with some urology. Easy access to London. Recognised for F.R.C.S. 2 Surgical Registrars on the staff. Preference to pre-registration candidates.

Apply, stating age, qualifications with dates, and experience, naming 3 referees, to Administrative Officer by 22nd November.

GLASGOW, S.W.1. SOUTHERN GENERAL HOSPITAL. SENIOR HOUSE OFFICER in Medicine.

Write immediately to Secretary, Board of Management for Glasgow South-Western Hospitals, 1301, Govan-road, Glasgow, S.W.1, naming 2 referees.

GOOLE. BARTHOLOMEW HOSPITAL. (44 surgical beds.) RESIDENT SENIOR HOUSE OFFICER required for general duties. Flat available on rental.

Applications, with copies of 3 recent testimonials, to Group Secretary, St. John's Hospital, Goole.

HAREFIELD HOSPITAL, Harefield, Middlesex. Applications are invited for the post of RESIDENT ANÆSTHETIST (Senior House Officer) for duties on the Thoracic Surgical Unit.

Applications, together with copies of 2 testimonials, to be sent to the Medical Director, Harefield Hospital, Harefield, Middlesex, by 17th November, 1958.

HEMEL HEMPSTEAD, HERTFORDSHIRE. WEST HERTS AND ST. PAUL'S HOSPITALS. Locum REGISTRAR ANÆSTHETIST required.

Applications should be sent to the Secretary, West Herts Hospital, Hemel Hempstead, as soon as possible.

HEMEL HEMPSTEAD. ST. PAUL'S AND WEST HERTS HOSPITALS. NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. REGISTRAR in Clinical Pathology required at above Hospitals. Post now vacant. Hospitals may be visited by direct appointment.

Application form obtainable from and returnable to Secretary, West Herts Group Hospital Management Committee, 9, Rickmansworth-road, Watford, Hertfordshire, by not later than 18th November.

HEMEL HEMPSTEAD. WEST HERTS HOSPITAL. NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. ANÆSTHETIC REGISTRAR required at above Hospital. Post recognised for F.F.A.R.C.S. Post vacant immediately.

Application form obtainable from and returnable to Secretary, West Herts Group Hospital Management Committee, 9, Rickmansworth-road, Watford, Herts, by not later than 18th November, 1958.

HEREFORD COUNTY HOSPITAL. (341 Beds.) House OFFICER (surgery) required immediately, pre-registration post. Hospital recognised for F.R.C.S. Married quarters are available.

Applications, with copies of 2 recent testimonials, to Medical Superintendent, County Hospital.

HEREFORD. GENERAL HOSPITAL. (154 Beds.) House OFFICERS (general surgery) required, pre-registration posts. 1 vacancy immediately, 1 post vacant 15th December. Hospital recognised by R.C.S. Duties include care of general surgical beds and in addition for 3 months of orthopædic beds and for 3 months of E.N.T. beds. Married quarters are available.

Applications, with copies of 2 testimonials, to be sent to the Group Secretary, Victoria House, Eign-street, Hereford.

HERTFORD COUNTY HOSPITAL. (171 Beds. Hospital situated 21 miles from London.) Applications are invited for the appointment of HOUSE SURGEON (general surgery, gynæcology and obstetrics) (first or second post). To commence 22nd December, 1958. Pre-registration post, recognised under F.R.C.S. regulations.

Applications to Group Secretary, Hertford Hospital Management Committee, County Hospital, Hertford, Herts.

HILLINGDON HOSPITAL, Uxbridge, Middlesex. (General—621 Beds.) HOUSE SURGEON required in General and Urological Surgery. Post recognised for F.R.C.S. and for pre-registration service.

Apply, together with copies of 3 recent testimonials, to Medical Director by 17th November.

HESWALL, WIRRAL, CHESHIRE. CLEAVER HOSPITAL. (220 Beds.) CENTRAL WIRRAL GROUP. Locum JUNIOR HOSPITAL MEDICAL OFFICER required for at least 3 months. Excellent facilities for obtaining good knowledge of modern treatment of pulmonary tuberculosis, including major surgery. Also non-tuberculosis and children's units.

Apply on forms from Secretary, Clatterbridge Hospital, Bebington, Wirral, Cheshire, immediately.

HITCHIN. LISTER HOSPITAL. (305 Beds.) North WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Whole-time MEDICAL REGISTRAR required end of December at the above Hospital. Preference given to applicants having experience in medical emergencies. Post suitable for candidates for M.R.C.P. The Hospital may be visited by direct appointment (telephone : Hitchin 3701).

Application forms obtainable from the Secretary, Luton and Hitchin Group Hospital Management Committee, St. Mary's Hospital, Luton, and returnable by 24th November.

HUDDERSFIELD ROYAL INFIRMARY. (285 Beds.) HUDDERSFIELD HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON required to commence duty immediately. The post is recognised as a pre-registration appointment and for the F.R.C.S. Salary in accordance with national scale.

Applications, together with copies of 3 recent testimonials, to be addressed to the undersigned as soon as possible.

H. J. JOHNSON, Group Secretary,
Huddersfield Hospital Management Committee,
The Royal Infirmary, Huddersfield.

HULL. KINGSTON GENERAL HOSPITAL. (419 Beds.) HULL A GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of RESIDENT HOUSE SURGEON (recognised for the F.R.C.S. examination). Pre-registration post.

Applications, with 2 recent testimonials, to the Hospital Secretary.

HUNTINGDON COUNTY HOSPITAL, Huntingdonshire. Applications are invited for the post of HOUSE OFFICER (medical), now vacant. Post recognised for pre-registration purposes. The selected candidate will be required to look after medical and paediatric cases and may be called upon to give emergency anæsthetics.

Apply, with full particulars, and names of 2 referees, to Secretary, County Hospital, Huntingdon.

ILFORD, ESSEX. KING GEORGE HOSPITAL. There will be a vacancy for a SENIOR HOUSE OFFICER ANÆSTHETIST at above Hospital on 20th December, 1958. The officer appointed will be required to be available for duty in other hospitals in the Group. Salary will be at the rate of £819 10s. p.a., less £150 p.a. for emoluments.

Applicants should have been registered not less than 1 year, and should send applications, accompanied by copies of 3 testimonials, to the undersigned within 7 days of the appearance of this advertisement.

H. F. HARRIS, Group Secretary,
Ilford and Barking Group Hospital Management Committee.
King George Hospital, Ilford.

IPSWICH AND EAST SUFFOLK HOSPITAL (Anglesea-ROAD WING). (350 Beds.) Applications invited for post of CASUALTY OFFICER (Senior House Officer grade), vacant 1st January, 1959. Post recognised for F.R.C.S. examinations.

Applications, stating age, nationality and experience, with copies of recent testimonials, to Hospital Secretary.

IPSWICH AND EAST SUFFOLK HOSPITAL (Heath-ROAD WING). (280 Beds.) HOUSE SURGEON (pre-registration) to General Surgeons, required 23rd November.

Applications, with full details and copies of 3 recent testimonials, to Hospital Secretary.

IPSWICH. FOXHALL HOSPITAL. (Actively engaged in the investigation and treatment of all forms of chest disease, including Respiratory Physiology Department and major surgery.) SENIOR HOUSE OFFICER required early November for duties mainly on non-tuberculous and surgical wards. Married quarters available.

Further particulars from Dr. G. R. MCNAB, Physician-Superintendent, to whom applications should be made.

IPSWICH. ST. HELEN'S HOSPITAL. (129 Beds for infectious diseases, pulmonary tuberculosis, long-stay orthopædics and geriatrics. The area Chest Clinic is in the Hospital.) HOUSE PHYSICIAN required (post-registration appointment). Accommodation available for married man.

Applications to JOHN WILLIAMS, Group Secretary, Ipswich Group Hospital Management Committee, at the Ipswich and East Suffolk Hospital (Anglesea-road Wing), Ipswich.

ISLEWORTH. WEST MIDDLESEX HOSPITAL. Senior HOUSE OFFICER, Psychiatric Unit. Duties mainly in observation wards. Post recognised by Conjoint Board and R.M.P.A. as D.P.M. training post.

Applications to Group Secretary, South West Middlesex Hospital Management Committee, West Middlesex Hospital, Isleworth, by 18th November, 1958.

KINGSTON HOSPITAL, Wolverton-avenue, Kingston-ON-THAMES. KINGSTON GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from suitably qualified medical officers for the post of SENIOR HOUSE OFFICER (E.N.T.) which is available on 1st December, 1958. The post is recognised for D.L.O. purposes.

Applications, stating age, qualifications and experience, together with 2 recent testimonials, should reach the Physician-Superintendent of the Hospital as soon as possible.

KETTERING GENERAL HOSPITAL, Kettering. (144 Beds.) Applications are invited from registered medical practitioners for the post of SENIOR HOUSE OFFICER in Anæsthetics, vacant 4th November, 1958. Post recognised for D.A.

Applications, giving details of qualifications and experience, and enclosing copies of 3 recent testimonials, to be sent to the Group Secretary, Kettering and District Hospital Management Committee, at the above address.

KETTERING AND DISTRICT GENERAL HOSPITAL. CASUALTY OFFICER (Senior House Officer). Recognised for F.R.C.S. The post, vacant now, offers wide experience of all traumatic conditions including fractures and some orthopædic cases, with charge of 30 Beds.

Applications, accompanied by testimonials, to be sent to the Group Secretary, General Hospital, Kettering.

KETTERING AND DISTRICT GENERAL HOSPITAL, NORTHAMPTONSHIRE. Applications are invited for the post of HOUSE SURGEON (pre-registration) which becomes vacant on 1st December, 1958. Post recognised for F.R.C.S.

Applications, stating age, experience and qualifications, together with copies of 3 recent testimonials, to be sent to the Group Secretary at the above address.

LEAMINGTON SPA. WARNEFORD GENERAL HOSPITAL. (211 Beds.) HOUSE SURGEON for Obstetric and Gynæcology Departments. New Obstetric Block of 50 Beds. Post vacant 6th December. Recognised for D.Obst.R.C.O.G.

Apply Hospital Secretary, together with copy testimonials.

LEEDS REGIONAL HOSPITAL BOARD. Registrar vacancies.

General Surgery

(*a*) Hull A Group. Mainly at Western and Kingston General Hospitals (120 general surgical beds). Resident. Recognised for F.R.C.S.

(*b*) Hull Royal Infirmary (80 general surgical beds) and other hospitals in the Hull A Group. Resident.

Orthopædic Surgery

(*a*) Bradford A Group Orthopædic Department. Offers excellent training in all branches of Accident and Orthopædic Surgery. Resident : detached furnished house suitable for married person, also single accommodation available.

(*b*) Harrogate General Hospital (total beds 253)—38 orthopædic beds.

Psychiatry

Stanley Royd Hospital, Wakefield (2000 Beds). Recognised for D.P.M. Married and single accommodation available (married accommodation outside the Hospital).

Thoracic Surgery

Regional Thoracic Centre, Pinderfields General Hospital, Wakefield (50 thoracic surgery beds). Recognised for F.R.C.S. Accommodation for a single person.

Infectious Diseases

Leeds Road Hospital, Bradford (120 infectious diseases beds). Accommodation for a single person only.

Applications, stating age, qualifications, and details of present and previous appointments with dates, together with the names and addresses of 3 referees, to the Secretary, Joint Registrars Committee, Park Parade, Harrogate, by 12th November, 1958.

LEEDS. THE UNITED LEEDS HOSPITALS. THE MATERNITY HOSPITAL AT LEEDS. SENIOR HOUSE OFFICER required for the Pædiatric Unit for a period of 1 year. Post vacant January, 1959. Successful candidate will work under the direction of the Professor of Pædiatrics and Child Health, and be responsible to him for the supervision and management of healthy and ailing babies in the Leeds Maternity Hospital. Previous experience of resident house posts in pædiatrics and/or obstetrics is desirable, but not essential.

Applications, stating age, qualifications, previous posts, with dates, and the names of 2 referees, should be sent to the Secretary to the Board, the General Infirmary at Leeds, by not later than 13th November, 1958.

LEEDS (near). WOODLANDS ORTHOPÆDIC HOS-PITAL, RAWDON, near LEEDS. (112 Beds.) SENIOR HOUSE OFFICER (resident) required.

Applications, stating age and experience, with copies of 2 testimonials, to the Secretary, The Royal Infirmary, Bradford, 9, Yorkshire.

LEICESTER. TOWERS HOSPITAL. Sheffield Regional HOSPITAL BOARD. Whole-time SENIOR REGISTRAR (psychiatry) required for duties at the above Hospital and Children's Psychiatric Clinics in Leicester and Leicestershire. Possession of a higher qualification desirable. Appointment for 1 year in first instance reviewable annually.

Application form and further details from Senior Administrative Medical Officer, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield. Forms to be returned by 17th November, 1958.

LINCOLN. ST. GEORGE'S HOSPITAL. (242 Beds.) LINCOLN NO. 1 HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the pre-registration post of HOUSE PHYSICIAN at the above Hospital, vacant from 1st December. Duties include acute medical, acute chest, and pædiatrics.

Applications, giving full particulars and names for reference, should be addressed to the Secretary.

LIVERPOOL, 14. BROADGREEN HOSPITAL. Applica-tions are invited for the appointment of SENIOR HOUSE OFFICER (resident) in the Thoracic Surgical Unit. Tenable for a period of 6 months from 1st December next. Salary £819 10s. p.a., less £150 p.a. in respect of resident charges.

Applications, on forms obtainable from the undersigned, to be returned completed as soon as possible.

H. BLYTHE, Group Secretary.

LIVERPOOL. THE UNITED LIVERPOOL HOSPITALS. Applications are invited for a post of SENIOR REGISTRAR in Pathology for the period ending 30th September, 1959. Annual reappointment thereafter until completion of the normal period of training will be considered without need for further application.

Apply by 22nd November, 1958, on form obtainable from the Secretary, The United Liverpool Hospitals, 80, Rodney-street, Liverpool, 1.

LOUTH, LINCOLNSHIRE. COUNTY HOSPITAL. (215 Beds.) GRIMSBY HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER (surgical), vacant now, at this General Hospital.

Applications, giving full details, together with the names of 2 referees, should be addressed to the Hospital Secretary.

LOUTH. COUNTY HOSPITAL. (215 Beds. Recognised for training for F.R.C.S.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT or NON-RESIDENT SURGICAL REGISTRAR required 1st January. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 17th November, 1958, giving age, nationality, qualifications, present and previous appointments, with dates, naming 3 referees.

LUTON, BEDFORDSHIRE. ST. MARY'S HOSPITAL. Whole-time Locum SENIOR HOUSE OFFICER required mid-November for 4–6 weeks.

Applications, giving full particulars, to the Secretary, St. Mary's Hospital, or telephone Luton 5790.

MAIDSTONE. WEST KENT GENERAL HOSPITAL. (141 Beds.) MID-KENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the pre-registration post of HOUSE SURGEON. 6 months' appointment. Vacant 3rd January, 1959. Recognised for F.R.C.S. Salary at the rate of £467 10s.–£577 10s. p.a. A deduction at the rate of £125 a year is made for board and lodging, and other services provided.

Applications should be forwarded, as soon as possible, to the Administrative Officer at the Hospital.

MEDWAY AND GRAVESEND HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER in Anæsthetics, vacant now. The appointment provides excellent training under Consultant supervision and is tenable for 1 year at a salary of £819 10s. p.a., less £150 p.a. if resident. The post is recognised for F.F.A. R.C.S.

Applications, stating age, qualifications, experience, nationality, and names of 2 referees, to Group Secretary, 20, Star Hill, Rochester, Kent.

MANCHESTER. BOOTH HALL CHILDREN'S HOSPITAL, BLACKLEY, MANCHESTER, 9. Regional centre for severe burns and scalds and plastic surgery (unit of 45 Beds).

JUNIOR HOSPITAL MEDICAL OFFICER required for post vacant on 1st December. £170 deducted for full emoluments.

SENIOR HOUSE OFFICER required, post now vacant. £150 deducted for full emoluments.

Applications, giving names and addresses of 2 referees, to be sent to Group Secretary, from whom further particulars may be obtained.

MANCHESTER REGIONAL HOSPITAL BOARD. JUNIOR HOSPITAL MEDICAL OFFICER (orthopædics and casualty), resident or non-resident. Period of contract to be arranged. Hours 9 A.M.–6 P.M. 5½-day week. Post now vacant.

Applications, stating age, qualifications and experience, together with copies of 2 recent testimonials, to Group Secretary, Burnley and District Hospital Management Committee, Burnley General Hospital.

MANCHESTER REGIONAL HOSPITAL BOARD. Bury AND ROSSENDALE HOSPITAL MANAGEMENT COMMITTEE. FAIRFIELD AND ROSSENDALE GENERAL HOSPITALS. Applications are invited for the post of REGISTRAR in Obstetrics and Gynæcology. Post recognised for examinations of the D.Obst.R.C.O.G.

Apply, stating full details and names of 2 referees, to H. WILKINSON, Group Secretary, Bury General Hospital, Bury, Lancs.

MANCHESTER. UNITED MANCHESTER HOSPITALS. MANCHESTER ROYAL EYE HOSPITAL. Applications are invited for the post of REGISTRAR at the above Hospital (attached to the University Department of Ophthalmology). Whole-time post (non-resident). Tenable for 12 months, subject to renewal. Previous experience in ophthalmology essential. The terms and conditions of service for hospital medical and dental staff will apply.

Applications to be made as soon as possible on forms obtainable from the undersigned.

H. R. NORTH, General Superintendent.

MANCHESTER. UNITED MANCHESTER HOSPITALS. SAINT MARY'S HOSPITALS, MANCHESTER. Applications are invited from registered medical practitioners, Male or Female, for the post of HOUSE PHYSICIAN in the Neonatal Unit of Saint Mary's Hospitals (attached to the University Department of Child Health) for a period of 6 months, vacant 1st February, 1959. Previous hospital experience essential and pædiatric experience desirable. Duties include the care of the newborn in the Maternity Department, the care of infants in the infants' ward, and work in the clinics under the charge of the Department of Child Health. Salary in accordance with national scales.

Applications, stating qualifications and experience, together with the names of 3 referees, should be sent to the undersigned not later than 24th November, 1958.

A. R. WISE, General Superintendent.

Saint Mary's Hospitals, Whitworth Park, Manchester, 13.

MANCHESTER. UNITED MANCHESTER HOSPITALS. SAINT MARY'S HOSPITALS, MANCHESTER. Applications are invited for the post of SENIOR HOUSE OFFICER in Obstetrics for 12 months from 1st February, 1959. Previous hospital experience in general medicine and surgery and in obstetrics necessary. Recognised for M.R.C.O.G. examination. Duties involve clinical responsibility for mothers and babies and supervision of work of pre-registration House Officers. National scales.

Application forms from the undersigned, to be returned by 24th November, 1958. A. R. WISE, General Superintendent.

Saint Mary's Hospitals, Whitworth Park, Manchester, 13.

MANCHESTER. UNITED MANCHESTER HOSPITALS. SAINT MARY'S HOSPITALS, MANCHESTER. Applications are invited for 2 posts of HOUSE OFFICER in Obstetrics, normally but not necessarily for provisionally registered medical practitioners. Salary in accordance with national scales. The appointments are for 6 months from 1st February, 1959.

Application forms may be obtained from the undersigned and returned not later than 24th November, 1958.

A. R. WISE, General Superintendent.

Saint Mary's Hospitals, Whitworth Park, Manchester, 13.

MANCHESTER. UNITED MANCHESTER HOSPITALS. SAINT MARY'S HOSPITALS, MANCHESTER. Applications are invited for the post of SENIOR HOUSE OFFICER in Gynæcology. Applicants must have had previous hospital experience in medicine and surgery. The post is recognised for the purpose of the M.R.C.O.G. examination. The appointment is for 6 months starting 1st February, 1959. Salary in accordance with national scales.

Application forms may be obtained from the undersigned and returned not later than 24th November, 1958.

A. R. WISE, General Superintendent.

Saint Mary's Hospital, Whitworth Park, Manchester, 13.

MANCHESTER. UNITED MANCHESTER HOSPITALS. MANCHESTER ROYAL INFIRMARY, MANCHESTER, 13. RESIDENT SURGICAL OFFICER (Registrar) to commence as soon as possible. Appointment for 12 months, renewable.

Application form, obtainable from the Secretary, to be returned by 21st November, 1958.

MANCHESTER. UNITED MANCHESTER HOSPITALS. MANCHESTER ROYAL INFIRMARY, MANCHESTER, 13. SENIOR HOUSE OFFICER (medical) to commence on 19th March, 1959. Whole-time, resident post for 6 months, renewable for a second and possibly a third 6 months. The successful applicant will be attached to the Rheumatism Research Centre and will have regular urgency medical duties as Deputy Resident Medical Officer.

Application form obtainable from the Secretary, to be returned by 21st November, 1958.

NEATH. CYMLA CHEST HOSPITAL, Cymla, Neath. MID GLAMORGAN HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of RESIDENT SENIOR HOUSE OFFICER. This Hospital has 84 Beds for the treatment of tuberculosis and other diseases of the chest.

Applications, naming 2 referees, to be addressed to the Group Secretary of the Committee, 8, Wind-street, Neath.

NEWARK GENERAL HOSPITAL. Nottingham No. 1 HOSPITAL MANAGEMENT COMMITTEE. JUNIOR HOSPITAL MEDICAL OFFICER (surgical) required for above Hospital situated on Great North Road, approximately 20 miles from Nottingham. Post offers good experience. Consultant staff attending Newark Hospital are on one or more of the Nottingham Hospitals. Flat available as married quarters. Salary and conditions of service in accordance with Ministry regulations. Duties to commence immediately.

Applications, giving names of 3 referees, should be sent to Group Secretary, Nottingham No. 1 Hospital Management Committee, General Hospital, Nottingham.

NEWCASTLE REGIONAL HOSPITAL BOARD. Locum Tenens REGISTRAR PSYCHIATRIST, whole-time, resident at St. Luke's Hospital, Middlesbrough (563 Beds). Tenure of appointment approximately 1 year. Salary £19 5s. per week, subject to usual conditions. Small flat available. Further particulars from Regional Psychiatrist.

Applications, with names and addresses of 3 referees, to Regional Psychiatrist, Newcastle Regional Hospital Board, Benfield-road, Newcastle upon Tyne, 6, immediately.

NEWTON ABBOT HOSPITAL. (General section, 65 Beds.) RESIDENT SENIOR HOUSE SURGEON, Male or Female, required middle November. Married quarters available.

Applications (quoting ref. F.364/40), stating qualifications, nationality, age, with copy testimonials, to be sent to Group Secretary, Torquay District Hospital Management Committee, Torbay Hospital, Torquay, S. Devon.

NEWTON ABBOT HOSPITAL. Resident Senior House SURGEON, Male or Female, required immediately, to act as Casualty Officer and House Surgeon to special departments, together with relief duties. Ability to give outpatient anæsthetics advantageous. Married quarters available.

Applications (quoting reference F.364/41), stating qualifications, nationality, age, with copy testimonials, to be sent to the Group Secretary, Torquay District Hospital Management Committee, Torbay Hospital, Torquay, South Devon.

NORWICH. NORFOLK AND NORWICH HOSPITAL. SENIOR ORTHOPÆDIC HOUSE SURGEON required (Senior House Officer status). 2 House Officers employed in the department. Post recognised for final F.R.C.S. examination requirements. Membership of a medical defence society is a condition of appointment.

Applications, giving full details with names of 2 referees, to Group Secretary, Hospital Management Committee, St. Stephen's-road, Norwich.

NORWICH. ST. ANDREW'S HOSPITAL, Thorpe, NORWICH. Applications are invited from registered medical practitioners (Male or Female) for the appointment of SENIOR HOUSE OFFICER (psychiatric). The Hospital has 1250 Beds, an admission-rate of over 750 annually, and affords comprehensive experience in psychiatry. The salary and conditions of service will be as laid down by the Ministry for Senior House Officers. Residential accommodation with board available.

Applications, stating age, qualifications and full particulars of experience, together with the names and addresses of 2 referees, to be sent as soon as possible to the Medical Superintendent.

NORTHWOOD, MIDDLESEX. MOUNT VERNON HOSPITAL. Applications are invited for the post of HOUSE PHYSICIAN for General Medicine and Neurology. Vacant 1st December, 1958. This post is recognised as a pre-registration appointment.

Applications, accompanied by 2 testimonials, to be forwarded to the Resident Medical Officer, Mount Vernon Hospital, Northwood, Middlesex, by 18th November, 1958.

NORTHWOOD, MIDDLESEX. MOUNT VERNON HOSPITAL. Applications are invited for the post of CASUALTY OFFICER (Senior House Officer), recognised by the Royal Colleges of Surgeons. Vacant 1st December, 1958.

Applications, accompanied by 2 testimonials, to be forwarded to Resident Medical Officer, Mount Vernon Hospital, Northwood, Middlesex, by 18th November, 1958.

NORTHWOOD, MIDDLESEX. MOUNT VERNON HOSPITAL. Applications are invited for 2 posts of HOUSE SURGEON. The 2 Doctors appointed will share the work of the Orthopædic, Genitourinary, and E.N.T. Departments. These are pre-registration appointments.

Applications, accompanied by 2 testimonials, to be forwarded to the Resident Medical Officer, Mount Vernon Hospital, Northwood, Middlesex, by 18th November, 1958.

NORTHWOOD, MIDDLESEX. MOUNT VERNON HOSPITAL. Applications are invited for the post of HOUSE SURGEON for General Surgery. Recognised for the Final F.R.C.S. in General Surgery, and recognised as a pre-registration appointment.

Applications, accompanied by 2 testimonials, to be forwarded to the Resident Medical Officer, Mount Vernon Hospital, Northwood, Middlesex, by 18th November, 1958.

NORTHWOOD, MIDDLESEX. MOUNT VERNON HOSPITAL. Applications are invited for the post of HOUSE PHYSICIAN to the Radiotherapy Department. This post is recognised as a pre-registration appointment.

Applications, accompanied by 2 testimonials, to be forwarded to the Resident Medical Officer, Mount Vernon Hospital, Northwood, Middlesex, by 18th November, 1958.

NOTTINGHAM GENERAL HOSPITAL. Pre-registration HOUSE SURGEON required. Duties to commence immediately.

Applications, stating age, qualifications, and experience, together with copies of testimonials, to be sent to Group Secretary.

NUNEATON. GEORGE ELIOT HOSPITAL. House OFFICER in General Surgery. Recognised pre-registration and F.R.C.S. Resident.

Applications to Hospital Secretary, George Eliot Hospital, Nuneaton.

NUNEATON. MANOR HOSPITAL. Senior House OFFICER in Anæsthetics. Resident or non-resident. Recognised D.A. and F.F.A. R.C.S.

Applications to Hospital Secretary.

NUNEATON. MANOR HOSPITAL. (125 Beds.) Senior HOUSE OFFICER (traumatic and orthopædic). Recognised F.R.C.S. Furnished flat available.

Applications to Hospital Secretary.

OXFORD REGIONAL HOSPITAL BOARD. Registrar in Pathology to the Area Laboratory at Northampton General Hospital. Post provides experience in all branches. Recognised for the D.Path. Vacant now.

Applications, on forms obtainable from the Secretary, 43, Banbury-road, Oxford, should reach him by 22nd November.

OXFORD. THE UNITED OXFORD HOSPITALS. Applications are invited for the post of HOUSE OFFICER in the Accident Service at the Radcliffe Infirmary for a period of 6 months, commencing as soon as possible.

Applications, on forms obtainable from the Administrator, Radcliffe Infirmary, Oxford, should be received not later than 22nd November, 1958.

OXFORD. UNITED OXFORD HOSPITALS. Senior REGISTRAR in Dental Surgery to the Churchill Hospital and Radcliffe Infirmary. Post recognised for the F.D.S.

Application forms obtainable from the Secretary, Joint Committee for Senior Registrars, 43, Banbury-road, Oxford, should be returned to him by 25th November.

PERTH. COUNTY AND CITY OF PERTH GENERAL HOSPITALS. The following House Officer posts will fall vacant on 1st February, 1959 :—

Bridge of Earn Hospital

*1 SENIOR HOUSE SURGEON (Fracture and Orthopædic Unit).
*3 HOUSE SURGEONS (Fracture and Orthopædic Unit).
*3 HOUSE SURGEONS (general surgical wards).
†1 HOUSE OFFICER (gynæcology and obstetrics).
‡1 HOUSE SURGEON or SENIOR HOUSE SURGEON (E.N.T. ward).
1 SENIOR HOUSE PHYSICIAN (general medical wards).
§1 SENIOR HOUSE OFFICER (anæsthetics).

Perth Royal Infirmary

*2 HOUSE SURGEONS (general surgical wards).
*1 HOUSE SURGEON or SENIOR HOUSE SURGEON (casualty).

Notes :

1. Senior House Officer posts are normally tenable for 12 months and Junior House Officer posts for 6 months, with the exception of the gynæcology and obstetrics post shown under Bridge of Earn Hospital : this post is tenable for 12 months and consists of 6 months gynæcology at Bridge of Earn Hospital, followed by 6 months obstetrics at Perth Royal Infirmary.

2. All Junior House Officer posts are recognised for pre-registration hospital service.

3. Posts marked * are recognised by the Royal College of Surgeons under the regulations for the F.R.C.S.

4. Post marked † is recognised both for gynæcology and obstetrics under the regulations for the M.R.C.O.G. The obstetrics post at Perth Royal Infirmary is also recognised for the Diploma in Obstetrics of the Royal College of Gynæcologists.

5. Post marked ‡ is recognised under the regulations for the D.L.O.

6. Post marked § is recognised under the regulations for the D.A. and F.F.A. R.C.S.

Applications, giving age, qualifications, experience, and names of 2 referees, should be sent to the Group Medical Superintendent, Perth Royal Infirmary, Perth.

PLYMOUTH, SOUTH DEVON AND EAST CORNWALL GENERAL HOSPITAL GROUP. SENIOR RESIDENT ANÆSTHETIST (Junior Hospital Medical Officer grade) for general anæsthetic duties in the Clinical Area. The post offers experience in anæsthesia for all grades of surgery.

Apply stating age, nationality, qualifications and experience, and giving names and addresses of 3 referees to the Group Secretary, 7, Nelson-gardens, Plymouth.

PLYMOUTH. SOUTH DEVON AND EAST CORNWALL HOSPITAL.

HOUSE SURGEON, pre-registration post, vacant 1st December, 1958. Devonport Section.

HOUSE SURGEONS, pre-registration posts, vacancies, 2 on 1st January, 1959. Freedom Fields Section.

HOUSE SURGEONS, pre-registration posts, vacancies, 1 immediately, and 9th January, 1959. Greenbank-road Section.

All posts are recognised for the F.R.C.S.

Apply with names of 3 referees, also stating age, nationality, qualifications and experience to the Group Secretary, 7, Nelson-gardens, Plymouth.

PLYMOUTH. SOUTH DEVON AND EAST CORNWALL HOSPITAL, Greenbank-road, PLYMOUTH. HOUSE PHYSICIANS, pre-registration posts, vacancies 1st and 14th January, 1959.

Apply with names of 3 referees, also stating age, nationality, qualifications and experience to the Group Secretary, 7, Nelson-gardens, Plymouth.

PLYMOUTH. SOUTH DEVON AND EAST CORNWALL HOSPITAL, FREEDOM FIELDS. Central Casualty Department. Resident Locum SENIOR HOUSE OFFICER in Casualty, vacant immediately. Recognised for the F.R.C.S.

Applications, with names of 3 referees, to be sent to the Group Secretary.

PRESTON ROYAL INFIRMARY. (400 Beds.) Senior HOUSE OFFICER in Orthopædics. Post recognised for F.R.C.S. Vacant now.

Applications, with names of 2 referees, to Group Secretary, Preston and Chorley Hospital Management Committee, Royal Infirmary, Preston, Lancs.

READING AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of RESIDENT SENIOR HOUSE OFFICER (Area Accident and Orthopædic Department). Recognised for F.R.C.S. Duties include work in Area Casualty Department at Battle Hospital, Reading. Person appointed will work with Registrar and House Officer.

Apply, giving nationality, present post, and qualifications with dates, together with the names of 2 referees, to Group Secretary, 3, Craven-road, Reading.

READING AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of SENIOR HOUSE OFFICER to the Department of Geriatric Medicine, which is being developed at Battle Hospital, Reading, under the charge of a Consultant Geriatric Physician.

Further particulars may be obtained from the Group Secretary, 3, Craven-road, Reading, to whom applications, stating age, qualifications, and names of 3 referees, should be addressed.

READING AREA DEPARTMENT OF MEDICINE. Applications are invited from registered and provisionally registered medical practitioners for 2 posts as RESIDENT HOUSE PHYSICIAN, vacant 1st December, 1958, for 6 months. Successful candidates required to carry out duties at the following Reading Hospitals : Royal Berkshire (397 Beds) and Prospect Park (104 Beds).

Write immediately, stating age, qualifications with dates, nationality, present post, with copies of 2 recent testimonials, to Secretary, Royal Berkshire Hospital, Reading.

READING COMBINED HOSPITALS. Area Department OF OBSTETRICS AND GYNÆCOLOGY. (100 Beds.) Applications invited from registered medical practitioners for resident post of HOUSE SURGEON. Post vacant 9th November, 1958, for 1 year. 6 months' gynæcology at Royal Berkshire Hospital, and 6 months in Maternity Unit at Battle Hospital. Both appointments recognised for Diplomas of R.C.O.G.

Write, stating age, qualifications with dates, nationality and present post, with copy of recent testimonial, to Secretary, Royal Berkshire Hospital, Reading.

READING. ROYAL BERKSHIRE HOSPITAL. (397 Beds.) Applications are invited from registered and provisionally registered medical practitioners for 2 posts as RESIDENT HOUSE SURGEON, vacant 26th November and 1st December, 1958, and tenable for 6 months.

Write, stating age, qualifications with dates, nationality, present post, with copies of 2 recent testimonials, to Secretary.

READING. ROYAL BERKSHIRE HOSPITAL. (339 Beds.) Applications are invited from registered medical practitioners (Male or Female) for the post of RESIDENT SENIOR HOUSE OFFICER (anæsthetics). Vacant immediately for a period of 1 year. Post recognised for F.F.A. R.C.S.

Write, stating age, qualifications with dates, nationality and present post, together with names of 3 referees, to Group Secretary, Reading and District Hospital Management Committee, 3, Craven-road, Reading.

RICHMOND, SURREY. ROYAL HOSPITAL. Pre-registration HOUSE SURGEON (recognised for F.R.C.S.) required 16th November, 1958, for busy acute general hospital of 121 Beds with full Consultant staff.

Applications invited immediately (acceptable in advance of examination results), giving age, qualifications, and names of 2 referees, to Administrative Officer.

RICHMOND, SURREY. ROYAL HOSPITAL. Pre-registration HOUSE PHYSICIAN required immediately for busy acute general hospital of 121 Beds with full Consultant staff.

Applications invited immediately (acceptable in advance of examination results), giving age, qualifications, and names of 2 referees, to Administrative Officer.

RICHMOND, SURREY. ROYAL HOSPITAL. (121 Beds.) KINGSTON GROUP HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited from experienced Medical Officers for the appointment of Full-time RESIDENT REGISTRAR (general surgery). Busy general hospital with full consultant staff. Single or married quarters are available.

Forms of application may be obtained from the Group Secretary (a foolscap stamped addressed envelope to be enclosed), and the completed forms should be returned to the Group Secretary, 35, Coombe-road, Kingston, as soon as possible.

RHYMNEY AND SIRHOWY VALLEYS HOSPITAL MANAGEMENT COMMITTEE.

St. James Hospital, Tredegar, Monmouthshire (38 general medicine, 43 chronic sick, and 43 obstetric beds). Married quarters.

OBSTETRIC HOUSE OFFICER (1st February).

Tredegar General Hospital (Surgical Unit of 50 Beds plus 6 orthopædic beds under daily supervision of Consultant Surgeon and visiting supervision of Orthopædic Surgeon. Busy Outpatient, Casualty, and Radiological Departments.) Married quarters.

HOUSE SURGEON (1st February) with opportunity to follow on to a House Physician or House Officer (obstetrics) if satisfactory.

Caerphilly District Hospital (acute general hospital, 226 Beds), 6 miles from Cardiff. Married quarters may be available. Vacancies on 1st February.

2 HOUSE SURGEONS, 1 with duties also in Orthopædic Department. Both recognised for F.R.C.S.

HOUSE PHYSICIAN.

Applications to the Group Secretary, Central Offices, Caerphilly-road, Ystrad Mynach, Hengoed, Glamorgan.

ROCHFORD GENERAL HOSPITAL. (620 Beds.) Applications are invited for the appointment of SENIOR HOUSE OFFICER (surgery). Post recognised for F.R.C.S., and is resident. Vacant 1st December, 1958.

Applications, stating age, &c., to reach the Secretary by 20th November, 1958.

ROCHFORD GENERAL HOSPITAL. (620 Beds.) Locum REGISTRAR (resident) required in the Obstetric and Gynæcological Unit at the above Hospital for the period 1st–30th December, 1958.

Applications, &c., to the Secretary immediately.

ROMFORD, ESSEX. OLDCHURCH HOSPITAL. (722 Beds.) RESIDENT HOUSE SURGEONS (2) required, 1 immediately and 1 on 3rd December next, in the General Surgical Unit. Recognised for F.R.C.S. Open to either pre-registration applicants or to fully registered practitioners. This very active Unit of a total of approximately 180 Beds affords ample opportunities for candidates to obtain first-class tuition and experience. The candidates appointed will be attached to a unit of approximately 60 Beds.

Apply immediately to Group Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital.

ROMFORD, ESSEX. OLDCHURCH HOSPITAL. (722 Beds.) ORTHOPÆDIC HOUSE SURGEON (resident) required in the Orthopædic and Accident Unit. The service consists of 100 Beds equally divided between traumatic surgery and "cold" orthopædics. Post is recognised for pre-registration purposes and for F.R.C.S.

Applications to be sent to Group Secretary, Romford Hospital Management Committee, Oldchurch Hospital, as soon as possible.

ROMFORD, ESSEX. VICTORIA HOSPITAL. (99 Beds.) RESIDENT HOUSE PHYSICIAN (Male) required immediately. (Not pre-registration appointment.)

Applications should be forwarded to the Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, Romford.

SALISBURY GENERAL HOSPITAL. Orthopædic DEPARTMENT. Applications are invited for the post of SENIOR RESIDENT HOUSE SURGEON or RESIDENT HOUSE SURGEON. Appointment recognised for pre-registration candidates, and also Fellowship regulations. Department has over 50 Beds and large outpatient turnover, dealing with fractures and all types of orthopædic surgery.

Applications, stating age, nationality, qualifications and experience, and naming 2 referees, to Group Secretary, Salisbury Group Hospital Management Committee, Odstock Hospital, Salisbury.

SCOTLAND. EASTERN REGIONAL HOSPITAL BOARD. Psychiatry. Applications are invited for a post as REGISTRAR in the Dundee Mental Hospitals Group (Westgreen Hospital 660 Beds, Gowrie House 100 Beds, and Baldovan Mental Deficiency Institution 415 Beds). The post gives experience in acute and long-term mental disorders, mental deficiency and also in the psychiatric unit at Maryfield Hospital, a general hospital of 370 Beds. All these hospitals are associated with the University of St. Andrews for teaching purposes. Salary and conditions of service in accordance with national agreement.

Further particulars and forms of application from the Secretary to the Board, 430, Blackness-road, Dundee, with whom applications must be lodged by 22nd November, 1958.

SCOTLAND. NORTHERN REGIONAL HOSPITAL BOARD. Applications are invited for a whole-time post of MEDICAL REGISTRAR at the Inverness Hospitals. Main duties are at Raigmore Hospital.

Schedules of application and further particulars are obtainable from the undersigned, to whom applications should be submitted by 22nd November, 1958.

A. M. FRASER, M.D.,
Secretary and Administrative Medical Officer.
Office of the Northern Regional Hospital Board,
Reay House, 17, Old Edinburgh-road, Inverness.

SCOTLAND. NORTHERN REGIONAL HOSPITAL BOARD. Applications are invited for the whole-time post of JUNIOR HOSPITAL MEDICAL OFFICER at the Ross Memorial Hospital, Dingwall. Applicants should have previous experience in obstetrics in hospital or general practice. The post is resident and a suitable house is available.

Schedules of application and further particulars may be obtained from the undersigned, with whom applications should be lodged by 22nd November, 1958.

A. M. FRASER, M.D.,
Secretary and Administrative Medical Officer.
Office of the Northern Regional Hospital Board,
Reay House, 17, Old Edinburgh-road, Inverness.

SCOTLAND. SOUTH-EASTERN REGIONAL HOSPITAL BOARD. REGISTRAR to the Geriatric Service in Edinburgh (total beds 450) based on Longmore Hospital (Assessment Unit 40 Beds), vacant on 1st January, 1959.

Apply, giving particulars of age, qualifications and previous experience, and the names of 2 referees, to the Secretary, 11, Drumsheugh-gardens, Edinburgh, 3, by 29th November, 1958.

SCOTLAND. SOUTH-EASTERN REGIONAL HOSPITAL BOARD. Applications are invited from Women practitioners for the appointment of REGISTRAR in Medical Paediatrics at the Bruntsfield and Elsie Inglis Hospitals, Edinburgh. This appointment would be associated with the Royal Hospital for Sick Children.

Apply, giving particulars of age, qualifications and previous experience, and the names of 2 referees, to the Secretary, 11, Drumsheugh-gardens, Edinburgh, 3, by 29th November, 1958.

SCOTLAND. SOUTH-EASTERN REGIONAL HOSPITAL BOARD. REGISTRAR in Surgery at the Deaconess and Longmore Hospitals, Edinburgh.

Apply, giving particulars of age, qualifications and experience, and the names of 2 referees, to the Secretary, 11, Drumsheugh-gardens, Edinburgh, 3, by 29th November, 1958.

SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD. Applications are invited for the following appointments, which will be for 1 year in the first instance :—

SENIOR REGISTRAR in Hæmatology based at Stobhill General Hospital, Glasgow.

REGISTRAR in Surgery based at the Royal Alexandra Infirmary, Paisley.

REGISTRAR in Psychiatry based at Woodilee Hospital, Lenzie, Glasgow. Small flat available.

Applications (12 copies), stating date of birth, qualifications, experience, present appointment, and the names of 3 referees, to reach the Secretary, Western Regional Hospital Board, 64, West Regent-street, Glasgow, C.2, by 22nd November, 1958.

SHEFFIELD, 5. CITY GENERAL HOSPITAL. Applications are invited for the resident post of Locum HOUSE SURGEON in General Surgery (Intern or Senior House Officer), for whole or part of period 14th November, 1958–14th January, 1959.

Apply, giving full details of experience and the names of 2 persons for reference, to the Group Secretary, Lyndhurst, Nether Edge Hospital, Sheffield, 11.

SHEFFIELD, 5. CITY GENERAL HOSPITAL. Department of Pathology, Area Laboratory. Applications are invited for the appointment of SENIOR HOUSE OFFICER (clinical pathology). Resident accommodation is available and optional. Opportunities for training in morbid anatomy, biochemistry, hæmatology, and bacteriology. The work of this and associated hospitals offers excellent experience to graduates who wish to make pathology their permanent career. The post is recognised for the D.Path.

Apply, giving details of age, qualifications, present and previous appointments, with dates, and the names of 2 persons to whom reference may be made, to the Group Secretary, Nether Edge Hospital, Sheffield, 11.

SHEFFIELD. THE UNITED SHEFFIELD HOSPITALS BOARD OF GOVERNORS AND SHEFFIELD REGIONAL HOSPITAL BOARD. Reciprocal Training Scheme for Senior Registrars. Whole-time SENIOR REGISTRAR in E.N.T. Surgery required with initial tenure of appointment at the Royal Infirmary and Children's Hospital, Sheffield. Appointment for 1 year in the first instance and renewable annually thereafter. Successful candidate will be transferred to the Royal Infirmary, Leicester, for the second phase of the appointment, in accordance with the arrangements under the Reciprocal Training Scheme. Renewal of appointment and transfer will be subject to satisfactory work and progress.

Applications, with the names of 3 referees, to the Chief Administrative Officer, United Sheffield Hospitals, West-street, Sheffield, 1, not later than 18th November, 1958.

SHEFFIELD. THE UNITED SHEFFIELD HOSPITALS. Applications are invited for the following posts :—

(*a*) REGISTRAR or SENIOR HOUSE OFFICER, Department of Neurology, Royal Hospital. Post vacant 15th December. This is a large Neurological Department in a Teaching Hospital Group. Post offers wide experience and opportunities for postgraduate training and for attending postgraduate teaching in other departments. Closing date 11th November, 1958.

(*b*) REGISTRAR and SENIOR HOUSE OFFICER, Rupert Hallam Department of Dermatology, Royal Infirmary. Closing date 11th November.

(*c*) SENIOR HOUSE OFFICER in Anæsthetics, Royal Infirmary. Post vacant now. Applications immediately.

Applications for posts (*a*) and (*b*), with names of 3 referees, to Chief Administrative Officer, United Sheffield Hospitals, West-street, Sheffield, 1.

Applications for post (*c*), with names of 3 referees, to Superintendent, Royal Infirmary, Sheffield, 6.

SHOREHAM-BY-SEA, SUSSEX. SOUTHLANDS HOSPITAL. Applications are invited for the appointment of RESIDENT HOUSE PHYSICIAN/HOUSE SURGEON to run consecutively for a period of 6 months in each post. Posts approved for pre- or post-registration practitioners and F.R.C.S.

Applications to Hospital Secretary, Southlands Hospital, Shoreham-by-Sea. A. V. OAKTON, Group Secretary,
Worthing Group Hospital Management Committee.

SHREWSBURY. ROYAL SALOP INFIRMARY. Orthopædic/Accident HOUSE SURGEON (Senior House Officer). Successful applicant will be allowed to attend for 2 days a month at the Robert Jones and Agnes Hunt Orthopædic Hospital, Oswestry, for postgraduate study, with the Consultant. Post recognised under revised Fellowship regulations in respect of 6 months' training required for the Final Fellowship examination. Vacant immediately.

Applications, with copy testimonials, to Group Secretary, Shrewsbury Hospital Group, Royal Salop Infirmary, Shrewsbury.

SHREWSBURY. ROYAL SALOP INFIRMARY. (241 Beds.) SENIOR HOUSE OFFICER (casualty) (1 of 2). Resident. Mornings 9 A.M. to 1 P.M., alternate afternoons with evenings and alternate weekends off duty. Post recognised for F.R.C.S. Vacant 14th November, 1958.

Applications, with copy testimonials, to Group Secretary, Shrewsbury Hospital Group, Royal Salop Infirmary, Shrewsbury.

SHREWSBURY. ROYAL SALOP INFIRMARY. (216 Beds.) 2 HOUSE SURGEONS. Vacant immediately. Pre-registration candidates eligible. Recognised for the F.R.C.S.

Applications, with copy testimonials, to Group Secretary, Shrewsbury Hospital Group, Royal Salop Infirmary, Shrewsbury.

SHREWSBURY. ROYAL SALOP INFIRMARY/COPTHORNE HOSPITAL. (500 Beds.) HOUSE PHYSICIAN. Pre-registration candidates eligible. Vacant immediately.

Applications, with copy testimonials, to Group Secretary, Shrewsbury Hospital Group, Royal Salop Infirmary, Shrewsbury.

SHREWSBURY. ROYAL SALOP INFIRMARY/COPTHORNE HOSPITAL. (500 Beds.) Senior House Officer to work as CLINICAL PATHOLOGIST to Group Laboratory. Appointment tenable for 1 year, resident or non-resident. Recognised for Diploma in Pathology. Vacant 1st January, 1959. A Unit of the Public Health Laboratory service is housed in the same building and there are facilities for training in all the 4 main branches of pathology.

Applications to Group Secretary, Shrewsbury Hospital Group, Royal Salop Infirmary, Shrewsbury, naming 3 referees.

SHREWSBURY. EYE, EAR AND THROAT HOSPITAL. SENIOR HOUSE OFFICER (E.N.T.) Duties at E.N.T. Hospital (68 Beds) and Copthorne Hospital (168 Beds). Post recognised for the D.L.O. and F.R.C.S. Vacant 29th November, 1958.

Applications, with copy testimonials, to Group Secretary, Shrewsbury Hospital Group, Royal Salop Infirmary, Shrewsbury.

SHREWSBURY. SHELTON MENTAL HOSPITAL. (1000 Beds.) SHREWSBURY HOSPITAL GROUP. JUNIOR HOSPITAL MEDICAL OFFICER. Appointment for 1 year in first instance. Single residential accommodation available. Recognised for D.P.M. Associated outpatient clinics.

Applications to Medical Superintendent.

SLOUGH, BUCKINGHAMSHIRE. UPTON HOSPITAL. Locum SENIOR SURGICAL REGISTRAR required 17th–29th November inclusive.

Applications, with names of 2 referees, to Secretary.

SOUTHAMPTON GENERAL HOSPITAL. (465 Beds. Recognised for F.R.C.S.) RESIDENT HOUSE SURGEON required end of November. Pre-registration candidate eligible.

Applications should be forwarded to the Group Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton, with copies of recent testimonials.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for an appointment as Whole-time REGISTRAR in General Surgery to fill a vacancy in the Bromley Group of hospitals. The successful candidate may be resident or non-resident. The post is recognised for the F.R.C.S. examination. The appointment will be in accordance with the terms and conditions of service of hospital medical and dental staff (England and Wales), and will be for 1 year in the first instance.

Applications, giving particulars of age, qualifications and experience, with relevant dates, together with the names and addresses of 2 referees, to be sent to the Secretary, Registrars Committee, South East Metropolitan Regional Hospital Board, 40, Eastbourne-terrace, London, W.2, not later than 22nd November, 1958.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for a whole-time appointment as RESIDENT SURGICAL OFFICER to fill a vacancy in the Canterbury Group of hospitals. No residential accommodation is available, but the successful candidate will be required to reside within easy reach of the Kent and Canterbury Hospital. The post is recognised for the F.R.C.S. examination. The salary will be £1061 10s. p.a., and the appointment will be in accordance with the terms and conditions of service of hospital medical and dental staff (England and Wales), and will be for 1 year in the first instance, renewable for a further year.

Applications, giving particulars of age, qualifications and experience, with relevant dates, together with the names and addresses of 2 referees, to be sent to the Secretary, Registrars Committee, South East Metropolitan Regional Hospital Board, 40, Eastbourne-terrace, London, W.2, not later than 22nd November, 1958.

ST. HELENS AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. ECCLESTON HALL HOSPITAL (75 Beds), DELPH LANE HOSPITAL, WHISTON (34 Beds). Applications are invited from fully or provisionally registered practitioners for the appointment of HOUSE PHYSICIAN to Eccleston Hall and Delph Lane Hospitals. The appointment may be made in the grade of Senior House Officer, dependent on the qualification and experience of the applicant. The appointment is approved as a pre-registration service post. The person appointed will work under the supervision of the Consultant Chest Physician for the Group. The work comprises all types of tuberculosis and includes chest clinic work. Good residential accommodation for a single person, male or female, is available. The post may be non-resident, subject to residence within reasonable distance from the Hospitals.

Applications to be forwarded to N. RICHARDS, Group Secretary, Whiston Hospital, Prescot.

ST. HELENS AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. WHISTON HOSPITAL, PRESCOT. (892 Beds.) Applications are invited for the appointment of RESIDENT ANÆSTHETIST at the above Hospital. The post is in the Senior House Officer grade, and is recognised for training for the Fellowship of the Faculty of Anæsthetists.

Applications, stating age, qualifications and experience, and giving 2 names for reference, should be sent to the undersigned immediately.

N. RICHARDS, Secretary.

Group Office, Whiston Hospital, Prescot.

ST. HELENS AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. ST. HELENS HOSPITAL. (196 Beds.) Applications are invited for the appointment of RESIDENT HOUSE SURGEON which provides experience mainly in orthopædics with some gynæcology. The post is recognised for pre-registration service and for the F.R.C.S. examinations and will be made in the Senior House Officer grade in the case of a candidate who has already held 2 pre-registration posts.

Applications, stating age, date of qualifications and experience, and giving 2 names for reference, should be forwarded immediately to N. RICHARDS, Group Secretary, Whiston Hospital, Prescot, Lancs.

ST. ALBANS CITY HOSPITAL, St. Albans, Hertfordshire. (384 Beds.) HOUSE PHYSICIAN (House Officer grade) required for duties mainly in the Pædiatric Department. Preference given to candidates seeking pre-registration post under the Medical Act, 1950.

Applications to Secretary, Mid-Herts Group Hospital Management Committee, Bleak House, Catherine-street, St. Albans.

ST. ALBANS CITY HOSPITAL, St. Albans, Hertfordshire. (384 Beds.) HOUSE SURGEON (House Officer grade) required for 1 of the 2 surgical teams. (Post recognised for F.R.C.S.) Post vacant 9th December, 1958, and tenable for 6 months. Preference given to candidates seeking post under the Medical Act, 1950.

Applications to Secretary, Mid-Herts Group Hospital Management Committee, Bleak House, Catherine-street, St. Albans.

ST. ALBANS CITY HOSPITAL, St. Albans, Hertfordshire. (384 Beds.) HOUSE PHYSICIAN (House Officer grade) required for 1 of the 2 medical teams. Post vacant 18th November, 1958, and tenable for 6 months. Preference given to candidates seeking post under the Medical Act, 1950.

Applications to Secretary, Mid-Herts Group Hospital Management Committee, Bleak House, Catherine-street, St. Albans.

ST. ALBANS CITY HOSPITAL, St. Albans, Hertfordshire. (384 Beds.) Locum Tenens GYNÆCOLOGICAL AND OBSTETRIC REGISTRAR, resident, required for the period 1st–13th December, 1958.

Applications to Secretary, Mid-Herts Group Hospital Management Committee, Bleak House, Catherine-street, St. Albans.

ST. ASAPH HOSPITAL, St. Asaph, Flintshire. Appointment of HOUSE OFFICER. Duties divided between ophthalmology (16 Beds), E.N.T. (12 Beds), and oral surgery (4 Beds).

Applications, stating age, qualifications and experience, accompanied by 2 recent testimonials, to be sent forthwith to the Group Secretary, Clwyd and Deeside Hospital Management Committee, Rhianfa, Russell-road, Rhyl.

STOCKPORT INFIRMARY. (163 Beds.) **Applications** are invited for the post of HOUSE OFFICER (general surgery) vacant 2nd November, 1958. This is an approved pre-registration post and is recognised for the F.R.C.S.

Applications, with copies of 2 testimonials, to the Group Secretary, Stockport and Buxton Hospital Management Committee, 59B, Shaw Heath, Stockport.

STOCKPORT INFIRMARY. (163 Beds.) **Applications are** invited for the post of SENIOR HOUSE OFFICER (Assistant Resident Surgical Officer) (general and orthopædics). Vacant now. The post is recognised for the F.R.C.S.

Applications, stating age, experience and qualifications, together with copies of 2 testimonials, to be addressed to the Secretary, Stockport and Buxton Hospital Management Committee, 59B, Shaw Heath, Stockport.

STOCKPORT. STEPPING HILL HOSPITAL. Applications are invited for the post of RESIDENT SENIOR HOUSE OFFICER (surgery). Vacant 29th November, 1958. The post is recognised for the F.R.C.S.

Applications, stating age, experience and qualifications, together with copies of 2 testimonials, to be addressed to the Group Secretary, Stockport and Buxton Hospital Management Committee, 59B, Shaw Heath, Stockport.

STOCKPORT. STEPPING HILL HOSPITAL. (529 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER (pædiatrics). The post, which may be either resident or non-resident, becomes vacant on 1st December, 1958.

Applications, stating age, qualifications and experience, together with copies of 2 testimonials, to be addressed to the Secretary, Stockport and Buxton Hospital Management Committee, 59B, Shaw Heath, Stockport.

STOKE-ON-TRENT (near). GROUNDSLOW HOSPITAL, TITTENSOR, near STOKE-ON-TRENT. Pre-registration or third HOUSE OFFICER post in Obstetrics and Gynæcology. Now vacant.

Applications, with details of qualifications and names for reference, to Group Secretary, Stafford Hospital Management Committee, 13, Foregate-street, Stafford.

SUNDERLAND AREA HOSPITAL MANAGEMENT COMMITTEE. Department of Medicine and Geriatrics. SENIOR HOUSE OFFICER or HOUSE OFFICER required immediately for the above Unit which has a total of 490 Beds (217 acute). Grade according to experience. Consultant Physician-in-charge. First-class experience afforded, good prospects of promotion, and excellent opportunities for studying for membership examination and research. Salary and conditions of service according to Whitley Council recommendations.

Apply, giving full details of qualifications and experience and naming 2 referees, to Hospital Secretary, General Hospital, Chester-road, Sunderland.

SURBITON GENERAL HOSPITAL, Ewell-road, Surbiton, SURREY. RESIDENT JUNIOR HOUSE OFFICER (surgical) required. Pre-registration post. Duties include casualty and outpatients; post provides interesting experience in surgery and medicine under visiting Consultants. Salary and conditions of service in accordance with national scale. Post vacant now.

Applications, stating age, qualifications and nationality, with copies of 2 recent testimonials, to the Administrative Officer, Surbiton General Hospital, Ewell-road, Surbiton, Surrey.

SWANSEA HOSPITAL, Swansea. (413 Beds.) Glantawe HOSPITAL MANAGEMENT COMMITTEE. Registered medical practitioners are invited to apply for the resident appointment of SENIOR HOUSE OFFICER in the Ophthalmic Department of the above Hospital. Vacancy 1st December, 1958. The post is recognised for the F.R.C.S.(Eng.) and D.O. examinations.

Applications, stating age, qualifications and experience, together with copies of 2 recent testimonials, should be addressed to the Hospital Secretary. T. E. JONES, Group Secretary.

TAPLOW, near MAIDENHEAD. CANADIAN RED CROSS MEMORIAL HOSPITAL. HOUSE SURGEON required for the Unit of Obstetrics and Gynæcology. Post recognised for M.R.C.O.G., vacant 22nd December. Pre-registration post.

Applications, with copies of 2 testimonials, to Secretary.

TAPLOW, near MAIDENHEAD. CANADIAN RED CROSS MEMORIAL HOSPITAL. SENIOR HOUSE OFFICER (anæsthetics) required 1st December. Post, which is tenable for 1 year, will be resident.

Applications, with 2 recent testimonials, to Secretary.

TAPLOW, near MAIDENHEAD. CANADIAN RED CROSS MEMORIAL HOSPITAL. HOUSE SURGEON required for post vacant 22nd December. Pre-registration post.

Applications, stating age, qualifications (with dates), with copies of 2 testimonials, to Secretary.

TILBURY AND RIVERSIDE GENERAL HOSPITAL. ORSETT BRANCH, ORSETT, ESSEX. Applications are invited from registered medical practitioners for the post of RESIDENT SENIOR HOUSE PHYSICIAN with pædiatric and other duties at the above Hospital. The post, which becomes vacant early in December, is for 6 months in the first instance, and is recognised for the D.C.H.

Applications, together with copies of recent testimonials, should be forwarded to the undersigned.

G. E. WHYTE, Group Secretary,
Tilbury and South East Essex
Hospital Management Committee.

Thurrock Hospital, Grays, Essex.

TORQUAY. TORBAY HOSPITAL. (180 acute general beds.) HOUSE OFFICER (medicine), Male or Female, required for last week of November. Pre-registration appointment. General duties which will include some work in the E.N.T., the Ophthalmic, and Radiotherapy Departments.

Applications, stating qualifications, nationality, age, together with copy testimonials (quoting reference F.955/91), to the Group Secretary, Torquay District Hospital Management Committee, Torbay Hospital, Torquay, S. Devon.

TUNBRIDGE WELLS (near). PEMBURY HOSPITAL, PEMBURY. (357 staffed available beds.) TUNBRIDGE WELLS GROUP HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (obstetrics and gynæcology). Applications invited for this appointment, which is a combined appointment of 1 year in obstetrics/gynæcology, recognised for M.R.C.O.G. Vacant 1st December, 1958. There are 66 obstetric beds and 20 gynæcological beds. Applicants must have held a previous obstetric post.

Apply, stating age, qualifications and experience, with 2 recent testimonials, by 16th November, 1958, to Group Secretary, Sherwood Park, Pembury-road, Tunbridge Wells.

WAKEFIELD. STANLEY ROYD HOSPITAL, Aberford-road, WAKEFIELD. Applications are invited from General Practitioners or other Physicians with experience in anæsthetics for the post of ASSISTANT PHYSICIAN (part-time) (2 vacancies) at the above Hospital, to assist mainly with physical treatments such as electroplexy, on 5 morning sessions (2½ hours) per week, i.e., 4 notional half-days. Salary £183 15s. p.a. for each notional half-day.

Address written applications, giving full personal particulars, details of qualifications, experience, &c., and 2 names and addresses for reference, to W. BOWRING, Group Secretary, Pinderfields General Hospital, Wakefield.

WAKEFIELD. PINDERFIELDS GENERAL HOSPITAL. REGIONAL THORACIC CENTRE. Applications are invited for positions of SENIOR HOUSE PHYSICIAN and SENIOR HOUSE SURGEON. Salary £819 10s. p.a. £150 p.a. charged for accommodation.

Address written applications, giving full personal particulars, details of experience, and 2 names and addresses for reference, to W. BOWRING, Group Secretary, Pinderfields General Hospital, Wakefield.

WAKEFIELD. PINDERFIELDS GENERAL HOSPITAL. REGIONAL THORACIC CENTRE. Applications invited for position of JUNIOR HOSPITAL MEDICAL OFFICER. Salary scale £852 10s.–£55–£1182 10s. p.a. £170 p.a. charged for accommodation.

Address written applications, giving full personal particulars, details of experience and 2 names and addresses for reference, to W. BOWRING, Group Secretary, Pinderfields General Hospital, Wakefield.

WALSALL HOSPITAL MANAGEMENT COMMITTEE. Locum HOUSE PHYSICIAN required for the Walsall General (Sister Dora) Hospital.

Apply Group Secretary.

WATFORD HOSPITAL UNIT. (560 Beds.) Applications are invited for the post of HOUSE SURGEON, pre- or post-registration. Post recognised for F.R.C.S. General surgical unit 100 Beds. 2 surgical teams. Residency at Peace Memorial Hospital. Salary according to National Health Service scale.

Please send applications, with copies of recent testimonials, to the Administrator, Peace Memorial Hospital, Watford, Herts.

WATFORD PEACE MEMORIAL HOSPITAL, Watford, HERTFORDSHIRE. (211 Beds.) CASUALTY OFFICER (Senior House Officer) required. Modern department employing 4 full-time Casualty Officers, including whole-time Surgeon-in-charge. Post recognised for F.R.C.S. Resident or non-resident. Post vacant 11th December.

Please send applications, with copies of 2 recent testimonials, to the Administrator.

WELSH REGIONAL HOSPITAL BOARD.

REGISTRAR in Dermatology based at Swansea General Hospital to serve the Glantawe Hospital Management Committee area and to undertake visits to neighbouring Hospital Management Committee areas. Non-resident.

SENIOR REGISTRAR (general medicine) Morriston Hospital, Morriston, near Swansea, may also be expected to serve other hospitals within the group. Subject to review annually.

REGISTRAR (general medicine), Caernarvon and Anglesey Hospital Management Committee, based Llandudno General Hospital, expected to serve other hospitals in Group. Non-resident.

REGISTRAR in Plastic Surgery, St. Lawrence Hospital, Chepstow (182 Beds). Expected to visit other hospitals in South Wales area. Considerable opportunities for training in specialty. Accommodation for single person.

REGISTRAR (general surgery), to serve Caernarvon and Anglesey Hospital Management Committee. Based at Llandudno General Hospital. Hospital recognised for F.R.C.S. Non-resident.

REGISTRAR (pædiatrics), based Merthyr General Hospital, Merthyr, to serve Merthyr and Aberdare Hospital Management Committee.

Subject to review end of first year.

Application forms from Senior Administrative Medical Officer, Temple of Peace, Cathays Park, Cardiff, within 14 days.

WEST BROMWICH AND DISTRICT HOSPITALS MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (anæsthetics) required, resident. New appointment. Duties mainly at 2 general hospitals. Recognised for D.A. and F.F.A. R.C.S. The post is tenable for 1 year.

Applications, with names of 3 referees, to be sent to the undersigned. J. O. ROBINS, Group Secretary.

West Bromwich and District General Hospital,
Edward street, West Bromwich.

WESTON-SUPER-MARE GENERAL HOSPITAL. (104 Beds.) Applications are invited from duly qualified medical practitioners for the pre-registration appointment of HOUSE PHYSICIAN. Single residential accommodation provided. Vacant January, 1959.

Applications, stating age, qualifications, together with names and addresses of 2 referees, should be addressed to the Group Secretary, Weston-super-Mare Hospital Management Committee.

WEYMOUTH AND DISTRICT HOSPITAL. (124 Beds.) HOUSE PHYSICIAN (Male or Female) required for resident, pre-registration post now vacant and tenable for 6 months.

Applications, stating age, experience and qualifications, together with copy testimonials, to Group Secretary, West Dorset Hospital Management Committee, Damers-road, Dorchester, Dorset, immediately.

WINCHESTER. ROYAL HAMPSHIRE COUNTY HOS-PITAL. (324 Beds.) HOUSE SURGEON (post recognised by Royal College of Surgeons) required for general surgery with some E.N.T. duties. Approved pre-registration post. Vacant 1st December.

Applications, with copies of 2 testimonials, to the Hospital Secretary.

WINCHESTER. ROYAL HAMPSHIRE COUNTY HOS-PITAL. (324 Beds.) HOUSE PHYSICIAN (pre-registration). Vacant 8th December.

Applications, with copies of 2 testimonials, to the Hospital Secretary.

WINCHESTER. ROYAL HAMPSHIRE COUNTY HOS-PITAL. (324 Beds.) SENIOR HOUSE OFFICER (orthopædics) required. Post recognised F.R.C.S. Wide experience under area orthopædic team. Appointment for 6 months in first instance. Vacant 13th December, 1958.

Applications, with copies of 2 testimonials, to the Hospital Secretary.

WINCHESTER. ROYAL HAMPSHIRE COUNTY HOS-PITAL. (324 Beds.) SENIOR HOUSE OFFICER in the Pathological Department. Vacant 1st January, 1959. Preferably resident. Duties will include training in the various branches of clinical pathology, especially hæmatology. Previous experience in clinical pathology desirable, but not essential.

Applications, with copies of 2 testimonials, to the Hospital Secretary.

WINDSOR. KING EDWARD VII HOSPITAL. House PHYSICIAN required, Male or Female, for post vacant 17th November. Pre-registration post.

Applications, with copies of 3 recent testimonials, stating age, qualifications, with dates, and nationality, to Secretary.

WINDSOR. KING EDWARD VII HOSPITAL. Registrar (Casualty Officer), resident or non-resident, required immediately. There is an Accident Unit of 30 Beds at the Hospital and, with the Casualty Department, forms part of the Accident Service for the Windsor Group, and includes duties with the E.N.T. and Eye Departments. Candidates should have had previous experience in the treatment of acute injuries.

Application forms obtainable from, and returnable to, Secretary, Windsor Group Hospital Management Committee, Alma-road, Windsor.

WOKING AND CHERTSEY GROUP LABORATORY. Applications invited for post of RESIDENT CLINICAL PATHOLOGIST (Senior House Officer). The post is one of 2, and involves a half share in emergency service. Training available in all branches of clinical pathology. Post tenable for 1 year. Salary £819 10s. p.a.

Applications, stating age, qualifications, &c., together with names of 2 referees, as soon as possible to the Director, Group Laboratory, St. Peter's Hospital, Chertsey, Surrey.

WOLVERHAMPTON AND MIDLAND COUNTIES EYE INFIRMARY. SENIOR HOUSE OFFICER required. 100 Beds and busy Outpatient Department. Post vacant the middle of November. Recognised for F.R.C.S. and D.O. examinations.

Applications to Secretary, Eye Infirmary, Compton-road, Wolverhampton, as soon as possible.

WOLVERHAMPTON. THE ROYAL HOSPITAL. (An Associated Hospital of the Birmingham University Medical School.) Pre-registration HOUSE OFFICER (general surgery). Vacant immediately. Recognised for F.R.C.S.

Apply, with copies of 2 testimonials, to the Secretary.

WOLVERHAMPTON. THE ROYAL HOSPITAL. (An Associated Hospital of the Birmingham University Medical School.) SENIOR HOUSE OFFICER (anæsthetics). Post vacant 20th January. Recognised for D.A. and F.F.A. R.C.S.

Apply, with copies of 2 testimonials, to the Secretary.

WOLVERHAMPTON. THE ROYAL HOSPITAL. (An Associated Hospital of the Birmingham University Medical School.) Pre-registration HOUSE OFFICERS (general surgery). Posts recognised for F.R.C.S. Vacancies occurring immediately and on 1st and 8th January.

Apply, with copies of 2 testimonials, to the Secretary.

WOLVERHAMPTON. THE ROYAL HOSPITAL. (An Associated Hospital of the Birmingham University Medical School.) Pre-registration HOUSE OFFICERS (general medicine). Vacancies occur on 2nd January and 1st February.

Apply, with copies of 2 testimonials, to the Secretary.

WOLVERHAMPTON. THE ROYAL HOSPITAL. Senior HOUSE SURGEON for Thoracic Surgery and Casualty. Post recognised for F.R.C.S. Vacant immediately.

Apply, with 2 testimonials, to Secretary.

WOODFORD GREEN, ESSEX. HARTS HOSPITAL. (100 Beds.) SENIOR HOUSE OFFICER required. The Hospital is a modern sanatorium with Area Chest Clinic. The post offers exceptional opportunities for gaining experience in tuberculosis and diseases of the chest. Salary £819 10s. p.a., less £150 p.a. for board, lodging, &c., or married accommodation available if required.

Applications, with copies of 2 recent testimonials, should be sent immediately to Secretary, Forest Group Hospital Management Committee, Langthorne-road, E.11.

WREXHAM. MAELOR GENERAL HOSPITAL (591 Beds), WAR MEMORIAL HOSPITAL (230 Beds). Applications are invited for the posts of HOUSE SURGEONS (general surgery) now vacant. The posts are approved for pre-registration and for the F.R.C.S. examinations. Fully registered practitioners may apply.

Applications and testimonials to be sent to the Group Secretary, Wrexham, Powys and Mawddach Hospital Management Committee, Maelor General Hospital, Croesnewydd-road, Wrexham, North Wales.

YORK. COUNTY HOSPITAL. (General—266 Beds.) Locum Tenens HOUSE PHYSICIAN required for 1 week from 17th November.

Applications, giving full particulars, and names of 2 referees, to Group Secretary, Bootham Park, York.

DUBLIN. SAINT LUKE'S HOSPITAL. Radiotherapeutic REGISTRAR. Candidates should possess the Diploma of Medical Radiotherapy or similar qualifications. The appointment is for 1 year in the first instance, and the successful candidate will be required to take up his duties on 1st January, 1959. Salary £800–£50–£1100. Commencement point of salary according to experience.

Applications (in writing), marked "R.R.", giving full details and the names of 2 referees, to the Registrar at Highfield-road, Rathgar, Dublin, forthwith. Canvassing disqualifies.

NORTHERN IRELAND HOSPITALS AUTHORITY. Applications are invited for a whole-time post as SENIOR HOUSE OFFICER in Clinical Pathology at the Laboratories, Belfast City Hospital. The terms and conditions will be in accordance with the Authority's application of the Spens Report to Northern Ireland.

Applications to be made on a form obtainable (with further particulars) from the Secretary, Northern Ireland Hospitals Authority, 44–46, Queen-street, Belfast, and to be returned not later than 25th November, 1958.

SOUTH BELFAST HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of HOUSE OFFICER at the Belfast City Hospital and/or Musgrave Park Hospital.

Application forms may be obtained from the Group Superintendent/Secretary, Belfast City Hospital.

CANADA. REGINA GENERAL HOSPITAL, Regina, SASKATCHEWAN, CANADA. Applications are invited for JUNIOR ROTATING INTERNESHIP appointments in an 800-Bed general hospital, commencing 1st July, 1959. All services very active. Salary $125 per month with full maintenance, with bonus of $25 per month payable for satisfactory service.

Applications should be sent to Mr. C. E. BARTON, Acting Superintendent.

MICHIGAN, U.S.A. OAKWOOD HOSPITAL, Dearborn, MICHIGAN. Applications are invited for 1- or 2-year approved GENERAL PRACTICE RESIDENCY in modern 234-Bed general hospital 10 miles from Detroit. Excellent facilities. Hospital approved for Exchange-Visitor programme. Beginning monthly salary $250 if single, $300 if married. Free housing.

Apply: Director.

ST. JOHN'S, NEWFOUNDLAND, CANADA. GENERAL HOSPITAL. (456 Beds.) The above Hospital has vacancies for INTERNES, for which applications are invited. Salary $2500 p.a. less $528 for maintenance. There is a full teaching programme, the Hospital is fully approved by the Canadian Medical Association for Interne training, approved by the Royal College of Physicians and Surgeons in Canada for postgraduate training towards certification and also recognised under the United Kingdom Medical Act for pre-registration year. Transport to St. John's will be provided and on completion of 1 year's service, return fare to the United Kingdom will be provided.

Applications, with full details as to age, &c., together with names of 2 referees, should be forwarded to DR. E. WILSON, Superintendent, General Hospital, St. John's, Newfoundland, Canada.

Public Appointments

FACTORY DOCTORS. Factories Acts, 1937 and 1948. The following appointments as Appointed Factory Doctor are vacant. Apply to Chief Inspector of Factories, 19, St. James's-square, London, S.W.1.

District	*County*	*Latest date for receipt of applications*
KINGSTON ..	SURREY ..	22ND NOVEMBER, 1958
WOODFORD ..	NORTHAMPTON ..	22ND NOVEMBER, 1958

HOME OFFICE. Inspector under the Cruelty to Animals Act (which is concerned with scientific experiments on living animals). Temporary post for experienced medical practitioner (Man or Woman), age 35 or over. Prospects of permanency. Salary £1825–£2350 (London).

Application form and further particulars from the Establishment Officer (L), Room 308, Home Office, Whitehall, S.W.1.

LONDON TRANSPORT EXECUTIVE. Applications are invited from registered medical practitioners for a post of MEDICAL OFFICER. The successful applicant will be responsible to Chief Medical Officer for general clinical work and medical supervision of working conditions. Commencing salary £1605 p.a. Appointment subject to medical examination. Contributory superannuation scheme after probation.

Applications, giving full details of qualifications and experience, together with the names of 3 referees, should be sent within 14 days of the appearance of this advertisement to the Staff and Welfare Officer, London Transport Executive (F/EV 709), 55, Broadway, S.W.1.

DEVON. COUNTY OF DEVON. District Medical Officer OF HEALTH/ASSISTANT COUNTY MEDICAL OFFICER. Applications are invited for the mixed appointment of Medical Officer of Health to the Borough of Totnes, the Urban Districts of Ashburton and Buckfastleigh, the Rural Districts of Totnes, and Assistant County Medical Officer to the Devon County Council. Salary £1471–£1856 10s. D.P.H. or equivalent essential. Diploma in Child Health and Certificate for the Ascertainment of Educationally Subnormal Children desirable.

Particulars and application forms, returnable by 22nd November, 1958, from the County Medical Officer, 45, St. David's Hill, Exeter.

GLOUCESTERSHIRE COUNTY COUNCIL. Assistant COUNTY MEDICAL OFFICER OF HEALTH AND SCHOOL MEDICAL OFFICER (Male). Must be registered medical practitioner. Possession of a Diploma or Certificate in Public Health an advantage. Salary £1050–£1475 p.a. Superannuable. Medical examination. Car driver and should possess a motorcar.

Application forms obtainable from County Medical Officer of Health, Berkeley House, Berkeley-street, Gloucester, returnable by 29th November, 1958.

GUY H. DAVIS, Clerk of the County Council.

HALIFAX. COUNTY BOROUGH OF HALIFAX. Assis-TANT MEDICAL OFFICER (Male or Female). Applications are invited for this appointment in the Health Department. Salary £1050–£1475.

Full particulars are available from the undersigned. Closing date for applications, 26th November, 1958.

Town Hall, Halifax. RICHARD DE Z. HALL, Town Clerk.

HERTFORDSHIRE COUNTY COUNCIL. Assistant COUNTY MEDICAL OFFICER required in and around a New Town in the north of the county. Diploma in Public Health or Child Health desirable, but not essential. Salary £1050–£1475. Car necessary. Travelling and subsistance according to national scale.

Application forms and further particulars from County Medical Officer, County Hall, Hertford. Forms to be returned by 21st November.

NORTHUMBERLAND COUNTY COUNCIL. Applications are invited for the post of SCHOOL MEDICAL OFFICER. The salary will be £1050–£50 (3)–£55 (5)–£1475 p.a. Previous experience may be taken into consideration in determining the commencing salary. Travelling expenses and subsistence allowances in accordance with the Council's scale will be paid. This post is superannuable and the successful candidate will be required to pass a medical examination.

Forms of application, obtainable from the Principal School Medical Officer, County Hall, Newcastle upon Tyne, 1, should be returned by 22nd November, 1958.

NOTTINGHAM. CITY OF NOTTINGHAM HEALTH SERVICES. SENIOR ASSISTANT MEDICAL OFFICER. Applications are invited for this appointment from registered medical practitioners holding the Diploma of Public Health. Salary will be within the scale £1150–£1575 p.a.; commencing salary will be fixed in accordance with experience. The successful candidate will be given opportunities for administrative and practical experience in all services of the Health Department. The appointment is superannuable and subject to the usual conditions.

Forms of application may be obtained from the Medical Officer of Health, Huntingdon-street, Nottingham, to whom they must be returned, together with the names of 2 referees, by not later than 28th November, 1958. T. J. OWEN, Town Clerk.

Guildhall, Nottingham. October, 1958.

SURREY COUNTY COUNCIL. Mixed appointment of Surrey County DEPUTY DIVISIONAL MEDICAL OFFICER and MEDICAL OFFICER OF HEALTH for Esher and Malden and Coombe (separate appointments). Applications invited from fully qualified registered medical practitioners for these appointments; superannuable and subject to medical examination and Sanitary Officers (outside London) Regulations, 1935–51. Salary within scale £1776 7s. 3d.–£2140 13s. 7d. according to experience. Essential car user allowance.

Applications, giving age, qualifications, experience, and the names of 3 referees, to County Clerk, County Hall, Kingston-upon-Thames, by 21st November, 1958. Canvassing disqualifies.

W. W. RUFF, Clerk of Surrey County Council.
F. EDWARDS, Clerk of Esher Urban District Council.
H. E. BARRETT, Town Clerk of Malden and Coombe.

MANCHESTER. CITY OF MANCHESTER HEALTH DEPARTMENT. Applications are invited from registered medical practitioners (Male or Female) for the position of MEDICAL OFFICER (maternity and child welfare) on the permanent staff. Applicants should have obstetric and paediatric experience, and possession of the D.Obst.R.C.O.G., D.P.H., or D.C.H. will be an advantage. Duties principally in Maternity and Child Welfare Clinics. Salary scale £1050–£1475 p.a., the commencing salary depending on previous experience. Medical Council C conditions of service.

Application forms may be obtained from the Town Clerk, Town Hall, Manchester, 2, to whom they should be returned within 21 days of the appearance of this advertisement.

GOVERNMENT OF SEYCHELLES. Medical Officer required for general duties and to take charge of tuberculosis work when present Tuberculosis Officer is on leave. Appointment on permanent basis, with pension (non-contributory) 1/600th of final pensionable emoluments for each completed month of service; or on contract (3-year tour) with gratuity (taxable) of 15% of salary on satisfactory completion of service. Salary scale £1082–£1500 a year. Income-tax at local rates. Quarters provided with basic furniture at rental of £6 a month. Free passages. Local leave permissible and generous home leave after tour. Candidates must possess qualifications registrable in United Kingdom; T.D.D. or experience in tuberculosis an asset.

Application forms from Director of Recruitment, Colonial Office, London, S.W.1 (quoting BCD.117/54/02).

GOVERNMENT OF SIERRA LEONE. Medical Officers with qualifications registrable in United Kingdom required for general duties in the Colony or Protectorate, either in charge of Hospital and medical district, or attached to field unit to control endemic diseases. Women may be considered.

Appointment may be :—

(*a*) On permanent basis with pension (non-contributory) at rate of 1/600th of final pensionable emoluments for each completed month of reckonable service.

(*b*) From National Health Service, candidates retaining superannuation rights up to 6 years, and receiving a gratuity (taxable) of 20% of aggregate salary.

(*c*) Short-term contract with gratuity (taxable) of 15% of aggregate gross salary, payable on satisfactory completion of engagement.

Salary under (*a*) and (*b*) £1248–£2046 a year, under (*c*) £1346–£2221, commencing-point fixed by qualifications and experience. Private practice may be allowed at discretion of Director of Medical Services.

Quarters normally available at low rental. Outfit allowance on first appointment £60. Return passages for officer, wife, and up to 3 children under 18 years. Children's allowance (subject to maximum of 3) of £48 a year (up to seventh birthday) and £96 a year (from seventh to eighteenth birthday) for children being educated outside Sierra Leone. Local leave permissible and generous home leave after each tour. Income-tax at local rates.

Application forms from Director of Recruitment, Colonial Office, London, S.W.1 (quoting BCD.117/15/02).

WEST AFRICAN COUNCIL FOR MEDICAL RESEARCH. ONCHOCERCIASIS RESEARCH UNIT. MEDICAL RESEARCH OFFICER required to be officer-in-charge of administration, organisation and welfare of a team of 3 carrying out research into onchocerciasis in Northern Ghana, under the general direction of the Helminthiasis Research Unit. Candidates must possess recognised medical degree. Possession of D.T.M.&H., or post-graduate experience of medical parasitological research, or tropical experience, an asset. Appointment on contract for 2 tours of 15–24 months each, with gratuity (taxable) of £12 10s. for each completed month of service. Salary scale £1660–£1960 p.a., starting-point determined by qualifications and experience. Free return passages once each tour for officer, wife, and up to 3 children under 18 years of age. Children's allowance of £100 a year for each child under 18 years old (up to maximum of 3) who is attending full-time at an educational institution outside West Africa. Quarters available at low rental. Outfit allowance £60. Income-tax at local rates. Generous leave after each tour, 7 days for each month of resident service in West Africa.

Application forms from Director of Recruitment, Colonial Office, S.W.1 (quoting BCD. 197/210/013).

SASKATCHEWAN. DEPARTMENT OF PUBLIC HEALTH
requires for its
Physical Restoration Programme
Headquarters—Regina

DIRECTOR OF PHYSICAL MEDICINE File No. 5649
$9936–$12,084

Specialist in Physical Medicine with experience in practice of specialty and in administration; to direct and develop an established rehabilitation programme within a rehabilitation centre of 50 inpatient beds and to assist in the promotion and development of physical medicine in general hospitals throughout the province.

SPECIALIST IN PHYSICAL MEDICINE File No. 5650
$9552–$11,616

To be responsible to the Director of Physical Medicine in an expanding rehabilitation centre of 50 inpatient beds and a large outpatient case-load with a staff of physiotherapists, occupational therapists, speech therapists, teacher therapists, psychologist, and social workers.

Forms and further information available at Public Service Commission, Legislative Building, or Personnel Officer, Department of Public Health, Provincial Health Building, Regina, Saskatchewan, Canada. Applicants should quote file numbers.

DUBLIN BOARD OF ASSISTANCE. Appointment of Temporary ASSISTANT PATHOLOGIST. Period of appointment 6 months. Salary £1288 10s. p.a. inclusive.

Application forms and full particulars may be obtained from the Establishment Department, 1, James's-street, Dublin. Latest date for receipt of completed application forms 27th November, 1958. J. J. NOLAN, Secretary.

DUBLIN, IRELAND. LOCAL APPOINTMENTS COMMISSION. Vacancies for COUNTY SURGEONS. (*a*) County Hospital, Bantry, Co. Cork, (*b*) Laois County Council, (*c*) Monaghan County Council, (*d*) Sligo County Council. Salary £1400 with permission to engage in private practice and to use certain beds for the treatment of his private patients. Residence provided in the case of (*c*) and (*d*).

Application forms and particulars from the Secretary, 45, Upper O'Connell-street, Dublin. Latest time for receiving completed application forms 5 P.M. on 28th November, 1958.

CORK. COUNTY OF CORK. Vacancies for Medical staff.

St. Finbarr's Hospital, Cork (Teaching Hospital—400 Beds and 145 Cots)

ANÆSTHETIC REGISTRAR. £888 10s. p.a.

SENIOR HOUSE PHYSICIAN. Pathological Department. £675 10s.–£782 p.a.

SENIOR HOUSE OFFICER. 2 posts—1 in Paediatric Department and 1 in Medical Department. £675 10s.–£782 p.a.

St. Mark's Orthopædic Hospital, Cork (Teaching Hospital—200 Beds)

SENIOR HOUSE SURGEON. £675 10s.–£782 p.a.

JUNIOR HOUSE SURGEON. £541 12s. 6d.–£701 7s. 6d. p.a.

St. Stephen's Regional Chest Hospital, Cork (500 Beds: 100 Beds for surgery—thoracic, tuberculosis, non-tuberculosis, cardiac, &c.)

HOUSE SURGEON. £516 7s. 6d.–£676 2s. 6d. p.a., plus bonus.

County Hospital, Mallow, Co. Cork (100 Beds—medical surgical and maternity)

HOUSE SURGEON. £382 12s. 6d.–£542 7s. 6d. p.a.

Application forms and particulars may be obtained from the County Manager, Courthouse, Cork, with whom completed applications should be lodged not later than 12 NOON on Saturday, 22nd November, 1958.

General Practice

For an Executive Council post (England and Wales) apply on form E.C.16A obtainable from the council. Mark envelope "Vacancy."

READING EXECUTIVE COUNCIL. Applications are invited from registered medical practitioners for a further VACANCY which has arisen on the death of a practitioner in the Western Area of the Borough. Classification—Intermediate. List as at 1st October—1375, including County patients. Surgery accommodation with flat and garage available, subject to negotiation with Executors.

Applications on Form E.C.16A to be received by the undersigned not later than first post on Monday, 17th November, 1958.

N. W. AUSTIN, Clerk of the Council.
10, Gun-street, Reading, Berks.

Hospital Services: Non-Medical Appointments

EPSOM. WEST PARK HOSPITAL MANAGEMENT COMMITTEE. BIOCHEMIST (basic grade) required. Salary £550–£1000 (plus London weighting) according to qualifications and experience. National Health Service Whitley Council conditions. Applicants with experience in routine medical biochemistry preferred, but suitable new graduates would be considered. Well-equipped laboratory. Opportunities for advanced and special work.

Apply, giving names of 2 referees, to Group Pathologist, Mental Hospitals' Group Laboratory, West Park Hospital, Epsom, Surrey.

Miscellaneous

Industrial Medical Officer, full-time, required at Metropolitan-Vickers Electrical Co. Ltd., Trafford Park, Manchester, 17, commencing as soon as possible. Postgraduate, casualty, and general practice experience preferred. Industrial experience not required, enthusiasm essential. B.M.A. salary.—Apply in writing to the Chief Medical Officer, giving full particulars.

Editorial Staff of The Lancet.—The Editor is considering the appointment of an additional Assistant Editor (whole-time) and invites application from men between 27 and 32 years of age who want to make medical journalism their career. The post will carry steadily increasing responsibility, and will be suitable for a man who has been Senior Registrar or Registrar or has gained equivalent experience outside hospital. Further information may be had from the Editor at THE LANCET Office, 7, Adam-street, London, W.C.2.

Required. Trainee Assistant, Group Practice, 4 Principals, entrée to large general hospital, Epping rural area, statutory salary and car allowance.—Drs. Evans, Sharp, Korte and Grylls, Station-road, Epping, Essex. Telephone: Epping 2727.

Assistantship vacant. £1350 outdoor; equivalent indoor. S.E. London. Good off-time. R.C. preferred. Experience unessential.—Address, No. 441, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Consulting Physician seeks from 1st March, 1959, share in Consulting-rooms (W.1). From noon until 4 P.M. Tuesdays and Fridays. Reception and cleaning service essential and facilities for screening and secretary preferred.—Address, No. 442, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Mr. Arthur Shaw, the well-known Medical Agent, of 61, Rodney-street, Liverpool. His book, "Doctors for Hire," published by Robert Hale, will be on sale as from 19th November, at 15s.

"Pregnancy Diagnosis by the Xenopus Method," 24-hour service. Send specimens of urine and £2 2s. fee. Hæmatology, Biochemistry, Flame Photometry.—WELBECK BIOLOGICAL LABORATORIES, 26, Park-crescent, Portland-place, W.1 (MUSeum 5386–7).

Doctors requiring applications, theses copied: Write to MANTON (WESTMINSTER) LTD., 153, Victoria-street, S.W.1 (VIC. 0141), who are specialists.

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Each golden yellow tablet contains 350 mg. of iron aminoates. This interesting new compound is produced by chelating iron with amino acids. The presence of amino acids profoundly affects the absorption of iron and they are responsible for the unique properties of 'Ferroids'.

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Treatment with 'Ferroids' is relatively inexpensive. The basic N.H.S. cost of 1 week's treatment is 1/2 to 3/1, based on the large pack of 1,000.

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Each tablet contains:
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(corresponding to 35 mg. elemental iron)
Aneurine hydrochloride 1 mg.

PACKS AND BASIC N.H.S PRICES

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